FLIGHT

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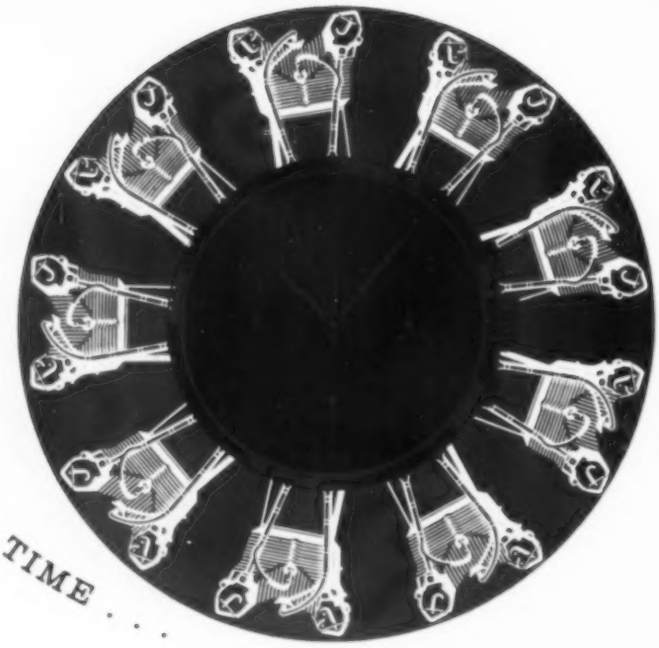
M A G A Z I N E

HELICOPTER AIRLINER OVER CHICAGO

(See Annual Helicopter Section)



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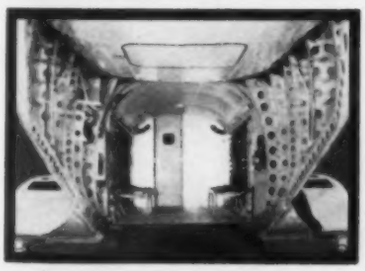
THE
VERTOL 107—MODEL II

Today's most advanced commercial helicopter



Top: Airline version of the Vertol 107—Model II seats up to 25 passengers in a modern, sound-proofed cabin.

Bottom: For cargo, the Vertol 107—Model II provides 850 cubic feet of clear cabin space with convenient rear ramp loading.

From years of research in multi-turbine powered vehicles comes today's most advanced transport helicopter—the Vertol 107—Model II. Backed by more than 200 hours during a year of prototype flying, the Vertol 107—Model II is now available to the commercial market.

Designed into the Vertol 107 is a new concept of versatility, economy and performance which makes it uniquely adaptable to a wide variety of airline and industrial applications. Its Vertol-pioneered tandem rotor design provides outstanding control, excellent towing and hovering characteristics and low rotor downwash velocity—plus superior center-of-gravity range which permits indiscriminate seating of passengers and prompt cargo loading. Its rear loading ramp, giant cargo area and superior amphibious characteristics are just a few of the other features which make the Vertol 107 the most advanced transport helicopter in the air.

Airlines and corporations are invited to write for detailed information on how the Vertol 107—Model II—first in an entirely new family of multi-turbine powered vehicles—can be profitably adapted to their specific requirements. Address inquiries to Commercial Sales Department.

VERTOL *Aircraft Corporation*

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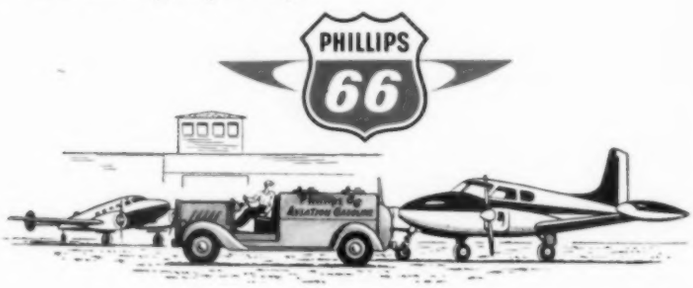
Southwestern Skyways, Inc., County Municipal Airport, Santa Fe. They also refuel jet-prop and piston-engine planes for Continental Airlines.

Southwestern's well-equipped radio shop does F. A. A. approved installation and maintenance on all light aircraft.

Approved repairs (F. A. A. 4168) on engines from 65 to 450 horsepower . . . on airframes from J3's to light twins.

● In contrast to the cherished antiquity of the locality, Southwestern Skyways at Santa Fe's Municipal Airport offers facilities and services as modern and complete as you'll find anywhere. Open from 6 AM to 8 PM, or longer upon request, Southwestern provides a courtesy car, an attractive pilots' lounge with a direct line to F.A.A. weather information and dependable Phillips *66* Aviation Oil and Gasoline . . . 80, 91 and 100 octane. Restaurant and car rental are at the terminal nearby. Licensed A & E's at Southwestern do approved repairs (F.A.A. 4168) on everything through 450 horsepower light twins. Their radio shop also does F.A.A. approved radio installation and maintenance for all makes of light personal and business aircraft.

As a Cessna distributor for Northern New Mexico and Southern Colorado, Southwestern plays a vital role in promoting private and executive flying throughout the area. Their charter service, manned by five licensed instructor-pilots, has flown over 7 million accident-free miles since starting 13 years ago.



AVIATION DIVISION • PHILLIPS PETROLEUM COMPANY • BARTLESVILLE, OKLAHOMA

AIR Report
Significant Trends and News

TURBOSUPERCHARGED PROPELLER ENGINE for lightplanes is being developed by Aircooled Motors from its new Franklin 6VS-335 for helicopters, rated at 225 hp. from sea level to 15,000 ft. (see page 37 for power curve and details). It uses low-priced, rugged AiResearch industrial turbo compressor from tractor, complete engine installation weighing 360 lbs. with turbo system weighing less than 40 lbs. Prop version would not need cooling fan in copter engine. Copter engine has been FAA certificated and powers new 3-place, $44,500 Bell Model 47G-3. Unaspirated engine would need 400-hp. sea level rating to deliver 225 hp. at 15,000 ft.

FAA EXPLANATION HAS BEEN ISSUED pointing out that new requirements for private and commercial pilots certificates do not specify instrument ratings. Applicants for certificates on or after March 16 are affected by new regulations, which are not retroactive. New private pilot requirements include "dual instruction in the basic control of the aircraft by the use of instruments" but do not specify the number of hours of instrument instruction, although applicant must demonstrate emergency manual capability in attitude control simulating the loss of visual reference during flight. New commercial pilot requirements include "minimum of 10 hours of instrument flight instruction" and applicant must demonstrate ability to manually control aircraft attitude solely by use of instruments. Both categories of applicants must also demonstrate use of radio for communications and navigation in cross-country flying. It will still be illegal to engage in IFR flying without an instrument rating.

OIL COMPANIES are considering dropping 91-96-octane fuel in favor of making 100-130-octane fuel available at more airports.

SOUTHWEST AIRMOTIVE, Dallast, has two new Air Force and Navy contracts for overhaul and testing of more than 2,000 jet engines and their accessories at a cost of about $3,750,000. Southwest has previously overhauled over 7,500 jet engines.

CESSNA 172 HOP FROM SAN FRANCISCO TO HONOLULU was flown last month by Peter Gluckman, the California watchmaker, who covered the 2,400-mile distance in 22 hrs. at 105-mph. IAS using 70% hp. Grossing over 3,200 lbs. at take-off, the 145-hp., 4-place 1960 Cessna was in the air after a run of 3,000 ft.

NATIONAL AVIATION TRADES ASSOCIATION has elected Ken Brugh, Jr., Greensboro, N. C., president; Henry Stuart, Dallas, and Walter Laudenslager, Red Bank, N. J., regional vice presidents, and Ed Oliver, Daytona Beach, Fla., treasurer. . . . **AVIATION DISTRIBUTORS AND MANUFACTURERS ASSOCIATION** has elected Paul A. Kennedy of Dallas as president and E. H. Fitch, Akron, and George Galipeau, Teterboro, N. J., vice presidents. . . . **NATIONAL AERONAUTIC ASSOCIATION** has elected Miss Jacqueline Cochran as president; Martin Decker, Philadelphia, first vice president; Edward C. Sweeney, Washington, D. C., treasurer; Mrs. Arlene Davis, Lakewood, Ohio, secretary, and W. P. MacCracken, Washington, D. C., general counsel. Tom Lanphier, Jr., vice presi-

FLIGHT MAGAZINE

DECEMBER, 1959 VOL. 48, No. 12

THIS MONTH'S COVER pictures a Chicago Helicopter Airways Sikorsky S-58 over the Chicago business district. Operating 137 scheduled flights daily over a 47-mile triangle connecting Meigs Field, Midway Airport and O'Hare International Airport with Winnetka and Gary, Indiana, CHA carried 200,000 passengers in 1959. The S-58 carries 12 passengers.
—(Sikorsky Photo.)

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Just Among Ourselves—EDITORIALS: OUTLOOK BRIGHT FOR 1960; ARMY TESTS BENEFIT GENERAL AVIATION; FAA PUBLIC RELATIONS 19

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Turbosupercharger for Power to Spare—FIRST LIGHT AIRCRAFT ENGINE CERTIFICATED WITH EXHAUST-DRIVEN COMPRESSOR . . 37

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18,734 Hrs. of Engine Reliability—PARTS REPLACEMENT STUDIED DURING PIPE LINE PATROL OPERATION 79

GEORGE E. HADDAWAY, Editor-Publisher; TOM ASHLEY, Managing Editor; FRED N. STONES, JR., Business Manager; LOUISE ROBERTSON, Circulation; E. H. PICKERING, Consultant; P. O. Box 750 (2700 N. Haskell Ave.), Dallas, Texas — Telephone TAylor 3-6191.

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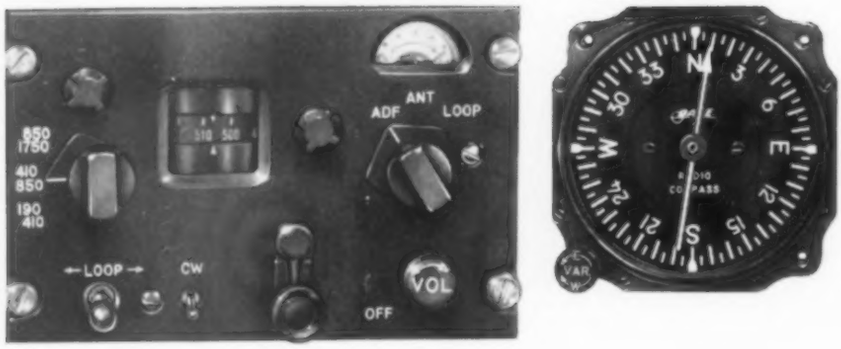
Another DARE First

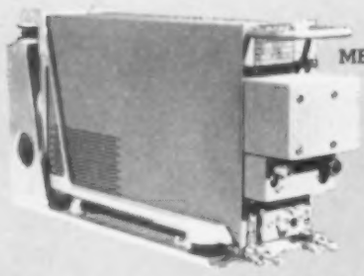


There's a new meaning to the letters, ADF—and a new standard of performance by which to judge any Automatic Direction Finder. It's been brought about by the sensational new Dare Automatic Direction Finder, the DADF-1. New in ease of operation, new in advanced circuitry, the DADF-1 offers airline dependability at a sensible price.

The DADF-1 is Another Dare First in many ways. It's the first ADF that needs no high voltage power supply—the first ADF to incorporate internal transistorized AC loop supply—the first in performance—the first in current economy. The highest voltage present in the DADF-1 is the electrical system voltage of your airplane.

The easy-to-read DADF-1 indicator is designed to the latest military concepts of readability. The remotely controlled ADF unit fits into a standard short 3/8 ATR rack, and can also be mounted horizontally for low clearance areas. Control heads are available in either MIL STD size or as a kit for custom installation. RMI compatibility is provided.

The DADF-1 is rugged, too. The sealed loop has rhodium plated contacts for long life and trouble-free operation. See the DADF-1 at your Dare distributor today.



MEETS FAA-TSO C-41 REQUIREMENTS

Also see the new Dare DN-560 VHF Nav-Comm System, and the new Dare DTR-360B VHF Transceiver with 20-watts of transmitting power.

There are more than 100 Dare Distributors to serve you

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Designers and manufacturers of aircraft communications and navigation systems, and military electronic equipment

dent of Convair and NAA president for last five years, was named chairman.

THREE DE HAVILLAND COMET 4C jetliners have been ordered by Mexicana Airlines (CMA) for $14,000,000 including spares and ramp equipment, with two deliveries before Jan. 1 and the third in mid-1960. The 86-passenger Comets will operate from Mexico City 1,580 miles to Los Angeles in 3 hrs. 15 mins., Mexico City 1,800 miles to Chicago in 3 hrs. 50 mins. and Mexico City 1,100 miles to Havana in 2 hrs. 30 mins. . . . **ALLEGHENY AIRLINES** may order 5 Canadair 540's powered by Napier Eland propjet engines.

NEW WORLD RECORD NON-STOP FLIGHT for lightplanes weighing 2,204 to 3,858 lbs. was set on Thanksgiving Day by Max Conrad, aviation's foremost distance flier and 1959 winner of the National Pilots Association's citation as Pilot of the Year. He flew a 180-hp., 4-place Piper Comanche 6,959.09 miles nonstop in 56 hrs. 26 mins. from Casablanca, Morocco, via Trinidad and Miami to El Paso. He exceeded by 2,000 miles the existing Class 3 distance record of 4,957 miles set 10 years ago by the late Bill Odom in a Beech Bonanza from Honolulu to Teterboro, N. J. Conrad's Comanche was the same plane which he flew 7,668 miles last June nonstop from Casablanca to Los Angeles in setting a new world record for Class 4 (3,858 to 6,614 lbs.) aircraft—but for his latest hop he replaced the original 250-hp. Lycoming engine with a 180-hp. Lycoming and reduced his fuel load by 110 gals., carrying 370 gals. On the Class 3 hop his Comanche averaged 127.15 mph. and 5.8 gals. per hour or 20.89 miles per gallon. He cruised at 100-mph. indicated air speed and consumed 333 gals. of fuel and 4 qts. of oil, his flight from Casablanca to Trinidad being 100 ft. off the water in daylight and 500 ft. off the water at night to utilize tail winds.

Airmen's Calendar

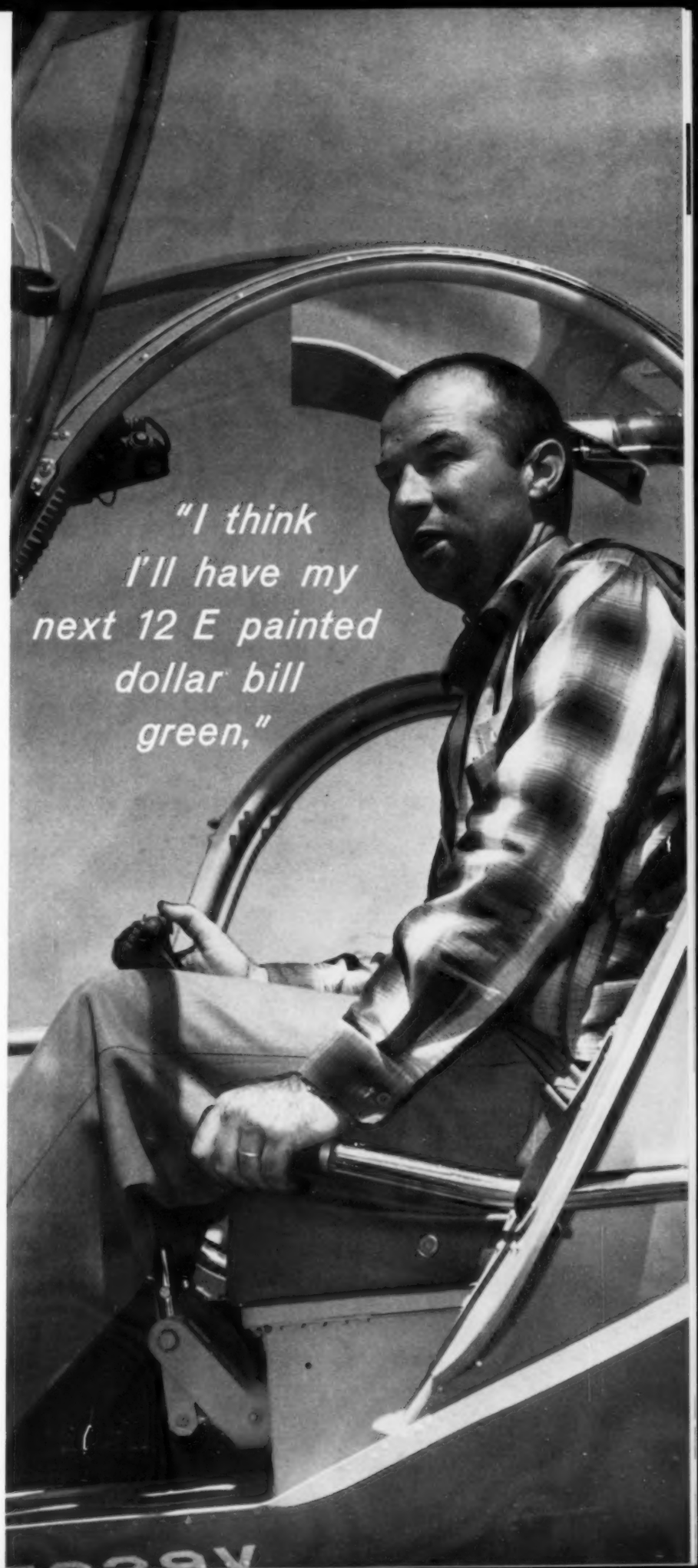
Dec. 17—Annual Portland Kitty Hawk Day Dinner Dance, Aero Club of Oregon.

Dec. 17—23rd Wright Brothers Lecture, National History Building, Smithsonian Institution, Washington, D. C., by Dr. Alexander H. Flox, Chief Air Force Assistant.

Jan. 18-20—12th Annual Helicopter Association of America Meeting, Disneyland Hotel, Anaheim, Calif.

Feb. 5-7—Texas Flying Farmers Convention, Texas Hotel, Ft. Worth.

Feb. 16-18—1st National Symposium on Non-Destructive Testing of Aircraft and Missile Components, Hilton Hotel, San Antonio, William E. Cory, general chairman, Southwest Research Institute, Box 2296, San Antonio.



says Bob Trimble, Aetna Helicopters, Inc. Etna, California and past Sec-Treas., Helicopter Association of America.

It would match the E's money making powers, Mr. Trimble and other new 12 E owners agree. Unanimous reports from the field testify to the ship's capacity for work. Greater useful load, matched with faster work speed is the answer. And high altitude work with the safety big power gives! The 12 E's rewriting the book on that.*

It's this simple. The day a 12 E goes to work for you, your operation will profit and grow. Want proof? Here's some: During the brief 2½ months that 12 E's have been delivered, several operators have already ordered their second E! For facts on how operators and owner-users from the pampas to the Rockies are lifting heavy helicopter cargoes and their own profits write, wire or phone Commercial Division

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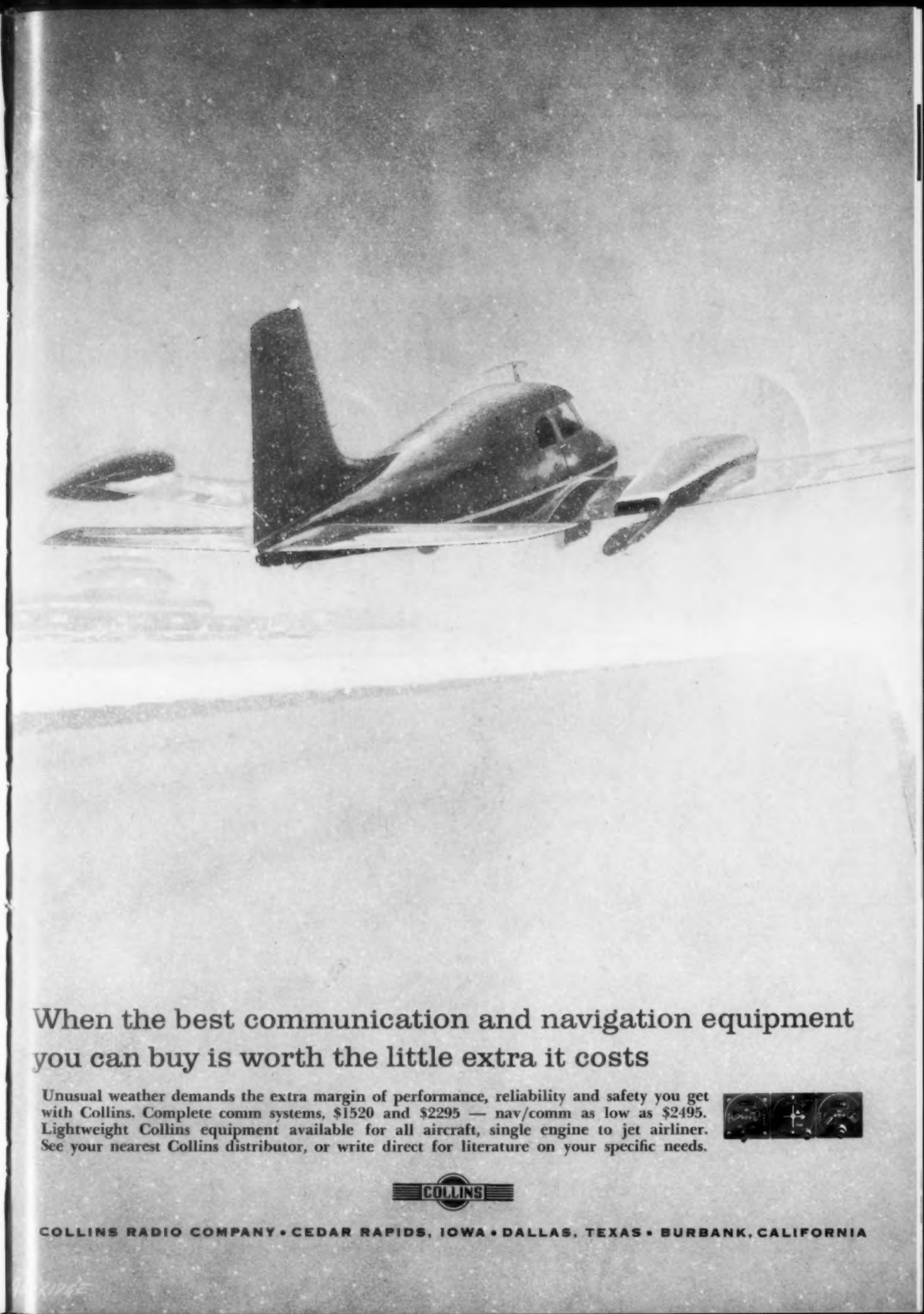

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Unusual weather demands the extra margin of performance, reliability and safety you get with Collins. Complete comm systems, $1520 and $2295 — nav/comm as low as $2495. Lightweight Collins equipment available for all aircraft, single engine to jet airliner. See your nearest Collins distributor, or write direct for literature on your specific needs.

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Top stability and performance mean realistic instrument flight programming

NOW BEING DEMONSTRATED TO THE MILITARY, the new CH-1C is proving that Cessna's years of intensive research have paid off with a dependable, low-priced helicopter that provides top utility.

DELIVERS A WIDE VARIETY OF MISSIONS with operational economy and reliability. In addition to reconnaissance-observation and personnel carrier missions, it makes large-scale, low-cost instrument training in light helicopters possible. An important economy extra: the CH-1C carries the usual instructor and student *plus an observing student.*

BUILT TO DO A JOB, day in and day out, this airborne work horse combines rugged endurance and operational economy with top performance.

FORWARD-MOUNTED ENGINE provides maximum access for maintenance... greater cabin space and comfort for 3-4 passengers ...and full 360° visibility.

Cessna

Omega SB-12
Powered by Lycoming (VO-540)

Brantly B2
Powered by Lycoming (VO-360)

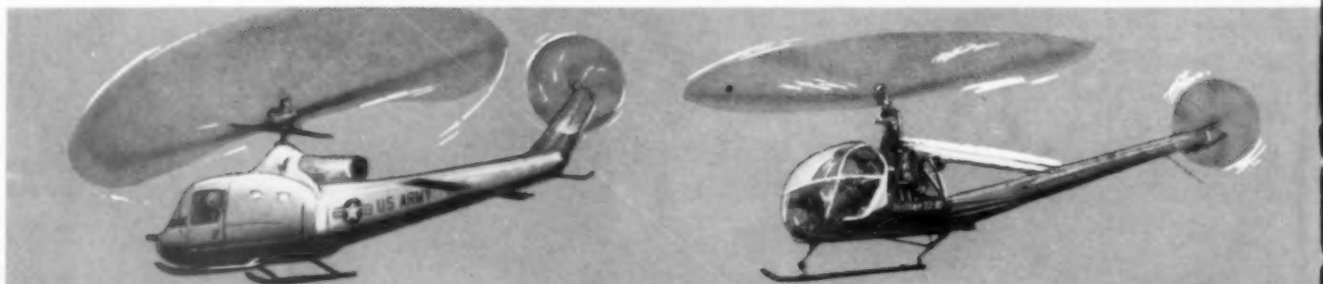
Chrysler Aerial Vehicle
Powered by Lycoming (IGSO-540)

Lycoming POWERS MORE D

Vertol 107
Powered by Lycoming (T53-L-1)

Hughes 269A
Powered by Lycoming (O-360)

HELICOPTERS AND VTOL A



Bell HU-1
Powered by Lycoming (T53-L-1)

Hiller 12E
Powered by Lycoming (VO-540)

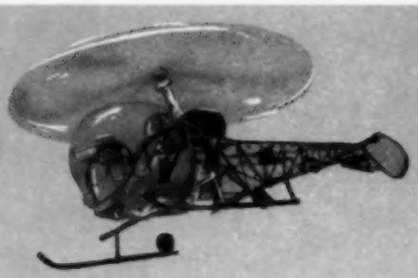
OTHER MANUFACTURER I

Kaman H-43B
Powered by Lycoming (T53-L-1)

Vertol 107B
Powered by Lycoming (T55-L-5)

Umbaugh Model 18
Powered by Lycoming (O-360)

Ryan Vertiplane
Powered by Lycoming (T53-L-1)



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Hughes two-place helicopter

Low Investment—At $22,500, the Hughes Model 269A cuts capital investment in helicopters, spare parts, tools almost in half!

Low Maintenance Costs—Any major component can be changed in less than one hour! Demonstrations show power-plant package interchange takes only 45 minutes...interchange of factory-balanced rotor blade takes only 15 minutes!

Low Operating Costs—The 269A requires but 1/2 hour of maintenance per flight-hour; Uses just 8 to 10 gallons of fuel per flight-hour; Gives at least 1000-hour life for all wearing parts in major components; Spare parts cost a fraction of similar units...for example, main rotor blade costs less than $250!

Smooth Performance—Outperforming larger helicopters in many ways, the 269A with smaller rotor diameter can get in and out of areas denied to others. More stability and less vibration mean passengers will prefer the nimble and lively Hughes helicopter...the tougher jobs seem easier, inspiring passenger confidence.

Greater Efficiency—Lower maintenance means higher availability, superior performance means more work every day... the compact Model 269A is more efficient in every way.

See It!...Fly It!...Compare It!...at the Helicopter Association of America Convention in Los Angeles, January 18-20, 1960 ...or watch for a demonstration in your area...soon.

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THREE-AXIS SYSTEM: *Pilot sets course—SP-3 flies it smoothly*

"A full 3-axis system adds just 18 pounds."

With the 3-axis SP-3, your aircraft is under full automatic control. The pilot simply sets his course. The SP-3 takes over to fly the plane . . . keep it level . . . steer it straighter than a human pilot can . . . and hold the desired heading unerringly. Automatic rudder, aileron and elevator action controls yaw, roll and pitch through time-tested Sperry air-driven Gyro-Horizon and Directional Gyro.

TWO-AXIS SYSTEM: *Straight, level and on course*

"We could begin with roll and pitch control, and add the third axis later."

The two-axis SP-2 in its simplest form uses the Sperry Gyro-Horizon to provide stabilization in pitch and roll. The SP-2A provides the additional feature of heading hold by using the Sperry Directional Gyro to make heading corrections through the roll axis.

SPERRY

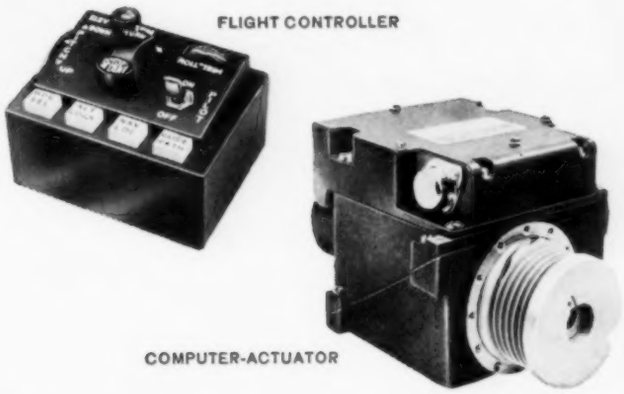
and light twin-engine adds just 18 pounds

SINGLE-AXIS SYSTEM: *Keeps the aircraft flying straight and on heading*

"Even with one axis, we'd be lots better off in weather, and could have heading hold."

This basic single-axis SP-1 uses the rudder to keep the aircraft on course at all times, and is almost an indispensable minimum in flying today. It prevents "graveyard spirals" for the pilot who inadvertently enters below-minimum weather conditions. It provides yaw stabilization, through the rudder, using the Sperry Directional Gyro. A second configuration, the SP-1A, offers roll stabilization by means of the Gyro-Horizon, through aileron control, and includes the Sperry Directional Gyro for heading hold.

ADD AXES AS DESIRED – With its advanced all transistor design in the modular or "building block" concept, the system is easily installed, and additional axes can be added quickly, easily, and at low cost, with no sacrifice of initial investment.



PRECISION AND DEPENDABILITY—Sperry's long experience assures the dependability of the SP-3 family of Automatic Control Systems; but in the event that service is required, one "building block" can be removed and a spare installed immediately, so that your aircraft is kept flying while repairs are made to the original unit.

With the new Sperry SP system you take advantage of Sperry's nearly half-century of experience in automatic flight, beginning with the first "automatic pilot" demonstrated by Lawrence Sperry in 1912, and including the world's leading military and commercial planes . . . among them the Douglas DC-8, Convair 880 and 600 jetliners, which have the jet-age SP-30 Sperry Flight Control System.

Write for descriptive booklet, stating the name and model of the aircraft you own or plan to buy.

SPERRY

SPERRY PHOENIX COMPANY, DIVISION OF SPERRY RAND CORPORATION, PHOENIX, ARIZONA

Welcome to our new Shareholders

Hundreds of Americans from every walk of life—who became shareholders in Southwest Airmotive through our first public issue of stock, October 28, 1959—now have joined with Company employees in a tradition of dedicated aviation service dating back to 1932.

We see in the overwhelming response accorded this offering a broadening of interest and encouragement, destined to add bright, new chapters to an already-honored history of corporate accomplishment.

We heartily welcome the many additions to our family circle and pledge them, and our customers everywhere, the all-out integrity and continued best efforts of one of aviation's proudest and most versatile organizations!

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Serving The Military: Jet engine and accessory overhaul for the U. S. Air Force and the U. S. Navy.

Serving The Airlines: Jet and piston engine overhaul; supplies.

Just among ourselves

EDITORIALS

Outlook Bright For 1960

A KEYNOTE speaker at the Aviation Distributors and Manufacturers annual meeting in Florida last month predicted that 1960 might well be the most profitable year in commercial aviation history. The lightplane manufacturers are anticipating sales increases from twenty to forty per cent, which is by any stretch of the imagination a fantastic figure. This year's sales will exceed 7,000 units.

Increased airplane sales mean increased sales of all related products. As aircraft utilization hours increase, so does the sale of fuel and maintenance services and replacement parts. Plant expansions are in evidence everywhere and in some phases of the market we might find the interesting situation of supply not being able to keep up with demand.

One of the most amazing growth experiences in all aviation history is that of the local service airlines, whose ten to twelve year history has been one of tough struggle against all the odds the human mind could devise. It is estimated that this year the local lines will carry 5,217,000 passengers as against a 1958 total of 4,200,000, grossing 119,956,000 as against only $94,654,000 in 1958.

Helicopter operations, also hamstrung and limited by both Federal policy and lack of suitable equipment, are on the threshold of tremendous growth, what with the advent of new machines specifically designed for commercial operations with profit making capabilities. Such revolutionary improvements as turbine power definitely point to a tremendous expansion in rotary wing services all over the country.

There is little doubt but that the opportunity exists for the coming year to be the best in commercial aviation history. The predictions that it will be are predicated on the assumption that the industry will put forth real sales effort and not start coasting. Healthy growth also will be dependent, as always, on enlightened Federal policy toward aviation. During the past year there has been evidence of persecution on the part of FAA toward pilots and plane owners in a very apparent crack-down on CAR violations. A return to the "police state" methods of following the book, which were tried at various times in the old CAA, can have a tremendous adverse effect on airplane ownership just as poor service and padded maintenance bills can have. The danger of killing the goose that lays the golden egg — the customer — is always with us.

If we can maintain and promote a healthy climate for aircraft ownership and operation, then and then only can the expectations for the most profitable year in history be realized.

Army Tests Benefit General Aviation

THERE'S an operation going on in the Army Aviation Center at Fort Rucker which has some fabulous direct benefits to U. S. civil aviation. It is the U. S. Army Transportation Aircraft Test and Support Activity, better known as TATSA, a field operation of the U. S. Army Transportation Supply and Maintenance Command with headquarters in St. Louis under the command of Brig. General William B. Bunker.

Only three years old, TATSA determines by hard testing precisely what supportability is required for any aircraft because supportability in a large measure determines whether or not any particular model of aircraft will be purchased. The more logistical requirements an aircraft has, the less interested the Army becomes. From the Army's standpoint the ideal aircraft is one they can fly the socks off without much maintenance and abandon it when worn out, say at the end of 1,000 relatively trouble-free hours.

Despite all the testing done by the manufacturer, by the contract compliance flight test, by airworthiness and performance testing and even user tests by the Army Aviation Board, TATSA comes along with its logistical evaluation of the aircraft to determine how many men, with what capabilities, tools, spare parts and equipment, will be required to keep 'em flying. The first test TATSA ran was 1,000 hours on an H-37 helicopter in six months. During one 82-day period, two H-21 and two H-34 helicopters logged a total of 4,000 hours in the air, which is equivalent to 12 years of normal Army service.

After 500 hours of continuous 24-hour-a-day operation, things really start to happen to engines, aircraft structure and accessories. This rapid aging provides fixes from which the Army can determine changes and improvements necessary in the production models, thereby eliminating the necessity for pipelines full of manpower, spare parts inventory and large maintenance bases. These are heavy burdens the Army doesn't want to carry into battle. Every airplane the Army buys must be maintained in the field under combat conditions. If this is too big a problem they simply don't want it. Hence the tremendous implication of TATSA's logistical testing of equipment in accelerated tests around the clock. SATSA, a similar operation for the testing of electronic equipment, is providing the same service and kind of information required by the Army in this most important field.

While the actual flying is carried on by Army aviators at the Test Center, maintenance is carried out under contract with the Test and Development Company, a division of Southern Airways of Atlanta, which also provides contract maintenance for SATSA and the Army Aviation Board. The kinship between Army aviation and U. S. civil aviation is admirably reflected in this arrangement, and the benefits derived from it, which would

be difficult to assess in dollars and cents, might well be counted as one of the greatest hidden assets in the civil aviation economy, resulting in improved and more dependable aircraft, engines and electronic equipment.

There simply is no substitute for the punishment of continuous operations under all sorts of conditions from heat to cold, from sand to snow, which the Army gives these prototype aircraft. Let's all hope the Army can soon get the funds to extend the tests to more than just one Y model of each design under study. More validity would come from testing several instead of only one prototype and the day of "maintenance-free" aircraft would be hastened materially.

FAA Public Relations

NOW that the Federal Aviation Agency has a year of operations under its belt with complete autonomy, divorced from the old Department of Commerce, it seems to us that an intelligent press and public relations program could be installed without detracting from the major priority undertakings involving air traffic control, airspace matters and a hard hand on stricter enforcement of the civil air regulations.

During the past year most everybody concerned has been patient with the "new" agency and its many sins of commission and omission. We have been among those who realized that a new broom usually sweeps clean and that it would be too much to hope for a sweetness-and-light, milk-and-honey administration during the tough transitional months. However, the honeymoon period is over and civil aviation people in particular are beginning to ask, "Just what have we created here — a monster, or a public service agency that needs a little more time to get oriented?"

The Federal Aviation Act which established the Federal Aviation Agency sought, among many things, to modernize our basic Federal aviation law so that the government might keep up with rapid technological developments and aviation progress in general. It was quite apparent the old way of doing things was outmoded and passage of the Act was a belated admission that the CAA — Department of Commerce machinery had broken down. A vast majority of the civil aviation leadership backed the legislation to the hilt, realizing at the time that never before had so much power been vested in a Federal agency. They understood that it would take power to straighten out some of the messes the old CAA had created. By the same token they now realize that any misuse of that power is a damnable thing.

The healthy integration of all air traffic into one system has been a tremendous accomplishment. It's still in the process of being perfected but up to now one must admit that what has been accomplished came about with a minimum of troubles and dislocations for all the miscellany of users of the airspace.

As far as civil aviation is concerned, however, the average airplane owner or pilot sees little difference between operating under the new FAA or the old CAA except for a sterner attitude toward mistakes, if he makes any, and a definite widening of the gap between him and the local agents. Once close and friendly, the attitude is now strictly impersonal. This may be an intentional objective of the FAA or a natural development from the tremendous increase in numbers of airplane owners and active pilots and increased work load of agents. Perhaps it is a combination of all three.

The fact remains that the erstwhile personal relationship between the CAA agent and the user of the airspace and airports of the country is about gone. This makes it even more mandatory that a wise, efficient and professionally directed public relations program be woven into the FAA organism, not only for adequate handling of aviation information but also for creating a more healthy public service attitude within the FAA itself.

It need not go down the old New Deal concept of public relations in trying to sell the public a bill of goods. It need only to see that proper use of the regular channels of information be employed in all matters affecting the flying public. Reprints of speeches by the big-shots in FAA and a moderate mailing out of proposed rule changes isn't enough. The user of the airspace, the public and the press will not tolerate for long another "ivory tower" operation with faulty or inadequate lines of communication between them and the all-powerful Federal agency.

As far as we're concerned the immediate creation of better lines of communications between the FAA and the taxpayers using airplanes and making a living with them should be a high-priority goal in the next few months. We don't care what they call it but it all comes under the generally accepted title of intelligent public and press relations.

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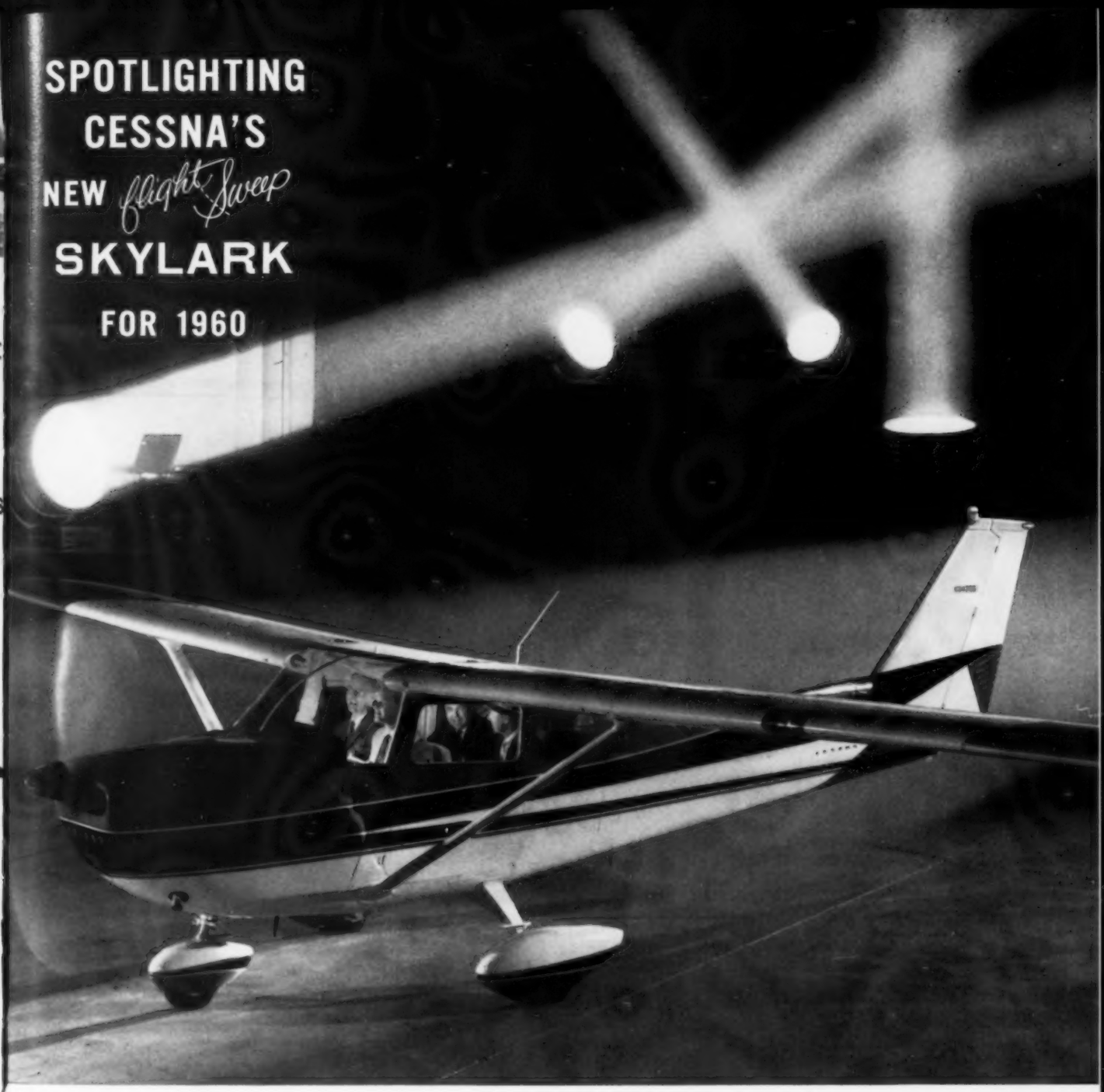

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LEVELAIR AUTOMATIC FLIGHT—developed for Cessna by *Tactair*—makes flying easy as dialing a radio! Low-price Levelair is available as optional equipment.

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KAMAN'S H-43B HUSKIE is powered by a Lycoming T-53 gas turbine with complete, single-package *fuel control and pumping system* engineered and precision-produced by Chandler Evans.

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Chandler Evans *pioneered* single-package design of formerly separate fuel system components and today enjoys a position of leadership in the field of small engine fuel control and pumping systems.

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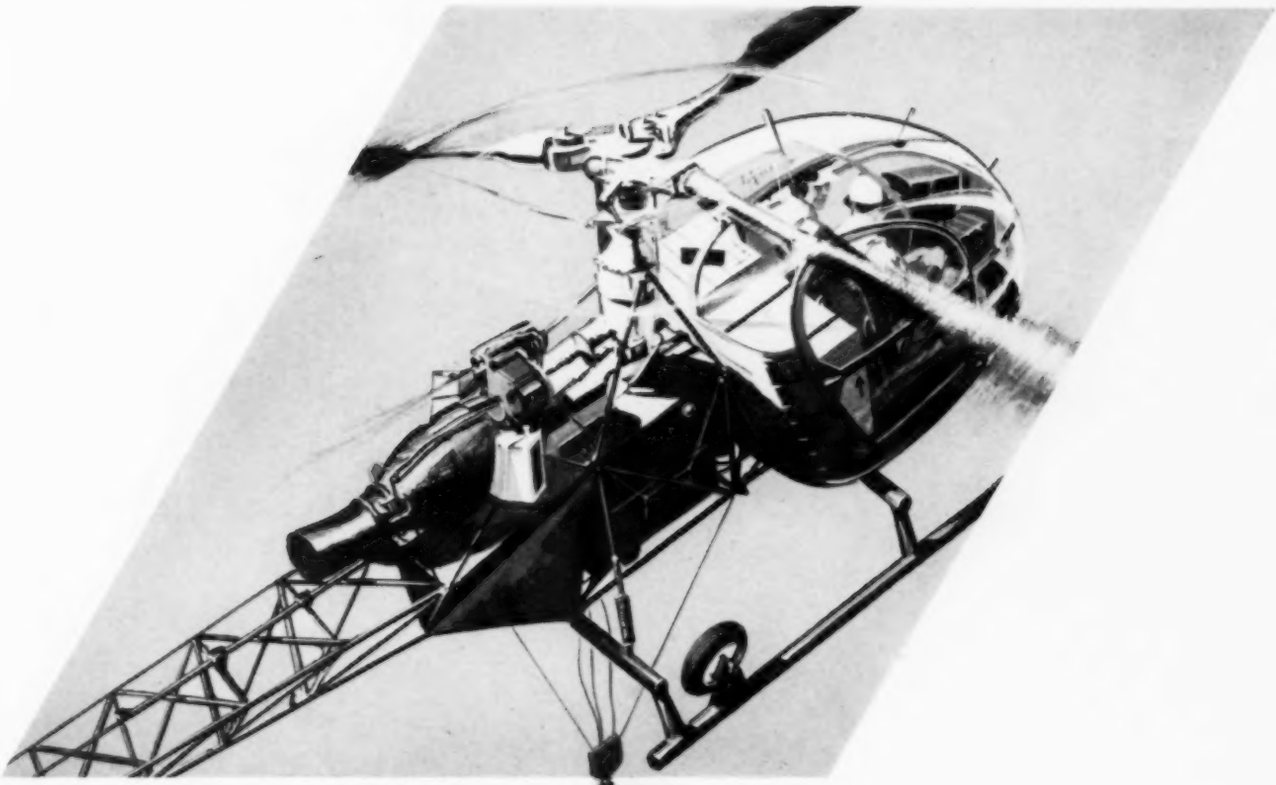

ON EVERY MISSION

In transporting, hauling, spraying, aerial inspection, construction work, stringing wire, or at nearly any job, the turbine-powered ALOUETTE II — operating in heat or cold, at high or low altitudes — SAVES DOLLARS.

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APPROVED BY EVERY MAJOR A

AEROSHELL OIL W

world's first non-ash, fully compounded dispersant aircraft oil with multi-viscosity characteristics

AeroShell Oil W is setting new performance standards in aircraft oil lubrication. It has accumulated more than 500,000 engine flight hours in both light and heavy piston engine aircraft, including helicopters. Its outstanding performance has won the enthusiastic endorsement of engine manufacturers, major airlines, commercial helicopter fleet operators and pilots alike.

Prior to the development of AeroShell Oil W, most fully compounded aircraft oils produced pre-ignition or spark plug fouling, the result of ash deposit formations in the combustion chamber. This serious problem has been eliminated by the revolutionary *non-ash* additives in AeroShell® Oil W.

CHECK THESE ADVANTAGES OF AEROSHELL OIL W

- ✓ **Much cleaner engines** – Dispersant additives keep ring grooves and oil drain holes free from deposits . . . reduce all kinds of engine deposits, soot, sludge and lacquer.
- ✓ **Longer engine life** – Reduced engine parts wear and lowered oil consumption permit longer operating time between engine overhauls.
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- ✓ **Lower Oil Consumption** – Operators of light planes, airliners and helicopters report 12 to 40% decreased oil consumption.

It's no wonder that one fleet operator after another is changing to AeroShell Oil W. Investigate AeroShell Oil W yourself!

OR AIRCRAFT ENGINE MANUFACTURER

Here's what they're saying about AeroShell Oil W—

"We are more than pleased with this oil and highly recommend its use . . . helicopter engine life has definitely been prolonged."
—*Leading commercial helicopter operator.*

"We intend to use AeroShell Oil W 100% throughout our system."
—*Major international airlines operator.*

"We saved a good 40% by using this oil."
—*Pipeline patrol service operator.*

"Our use of AeroShell Oil W has brought about an immediate 25% reduction in engine overhaul costs . . . truly a helicopter maintenance break-through."
—*Helicopter business service operator.*

"By using an ashless additive, Shell has eliminated the problem of pre-ignition . . . has extended overhaul period due to reduction in deposits."—*Pilot.*

AeroShell Oil W is available in 2 viscosity grades:

80 GRADE for small engines where straight mineral oil grade 55, 65 or 80 is normally recommended.

100 GRADE for large engines where straight mineral oil grade 100 or 120 is normally recommended.

Write today for complete information and technical data on AeroShell Oil W.

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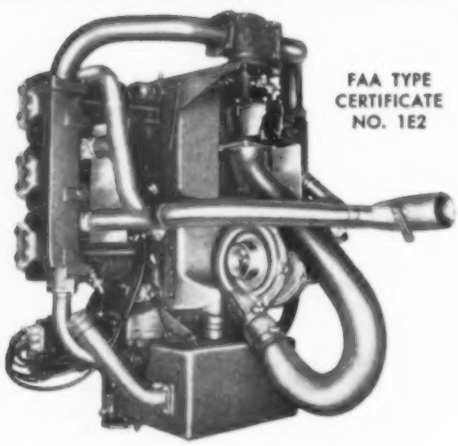
SHELL

New BELL 47G-3 with FRANKLIN Turbosupercharged engine does

UNHEARD-OF THINGS AT HIGH ALTITUDE



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In a series of unprecedented tests on Pikes Peak, this new helicopter-engine combination has proved its ability to:

- Hover at maximum gross weight at altitudes in excess of 16,000 feet.
- Lift its own weight (1,539 lbs) off Pikes Peak or at any such altitude.
- Maintain 225 h.p. sea level rating to 15,000 feet plus.
- Carry to 20,000 feet altitude and land a useful load of 1,000 lbs.

Throughout the two-week altitude test program, neither maintenance nor repairs (not even a spark plug change) were performed on the Franklin 6VS-335 turbocharged engine.

For more information on this extraordinary engine, write Aircooled Motors, Inc., Syracuse 1, N. Y.

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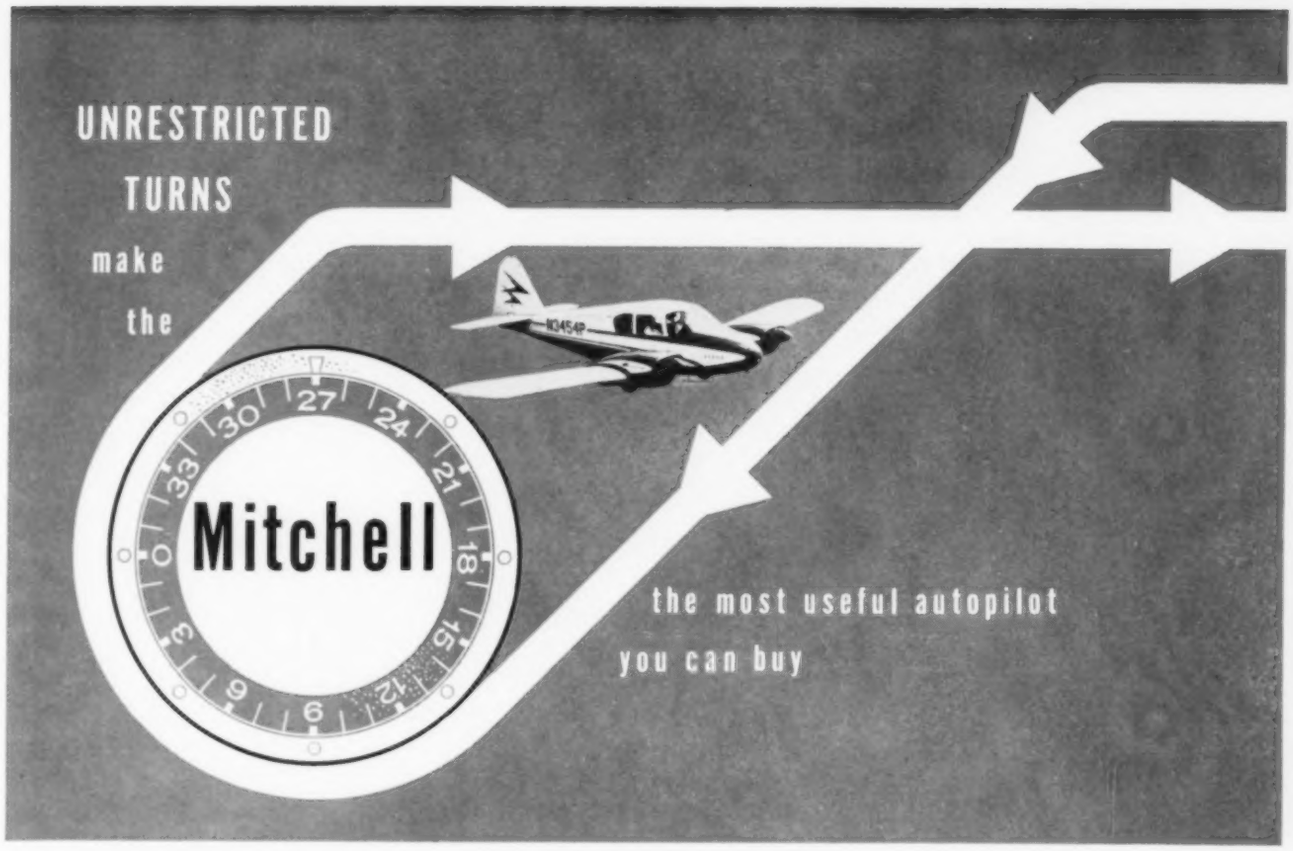

Fly precision holding patterns, procedure turns, IFR approaches . . hands-off . . . with the Mitchell all-transistorized automatic pilot. Unlike other lightweight autopilots, you never need to disengage or overpower the Mitchell to turn 180, 270, or 360 degrees. Simply turn the directional gyro the number of degrees you wish to turn and let your Mitchell do the flying. Whether you fly for business or pleasure . . . VFR or IFR . . . this superb eight-pound autopilot will introduce you to a new realm of precision flying. You can make smooth turns, hold straight and level flight, or establish climbs and let downs . . . completely automatically . . . with the Mitchell. Because it is transistorized, the Mitchell is simple and inexpensive to install, requires no warm-up, and uses less power than your instrument lights. FAA approved for almost all single-engine and light twin business aircraft.

Let your Mitchell dealer demonstrate this precision automatic pilot, used on more record-breaking endurance and distance flights than any other make. **$2425** for 12 volt system; **$2650** for 28 volt system. (Optional altitude and heading selectors extra).

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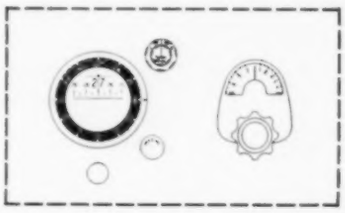
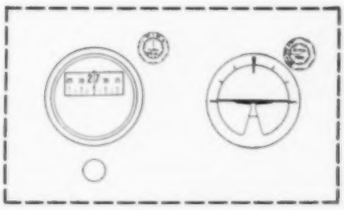


For the pilot who wants the ultimate in an automatic pilot, Mitchell now offers two new optional features: **Automatic Heading Selector** that enables you to dial the exact heading you wish to fly; **Automatic Altitude Selector** that allows you to dial your altitude, either before or after engaging the autopilot. New heading and altitude selectors may be added to any transistorized Mitchell already in service.



New Mitchell 2-control model is now available for almost all single-engine, 4-place aircraft for only **$1,095** (with Automatic Heading Selector **$1,480**). The 2-Control Mitchell has all the features of the 3-Control model except pitch control, which can be added at any time.

"I Left The Prop Behind"

A behind-scenes report on the 1,304-mile, 12½-hour World Record Flight of a dead-engined twin Apache—and the "secret weapon technique" that made it possible

by HERB FISHER international aviation authority, veteran test pilot, author

Mr. Fisher

Sunrise, Aug. 1, 1959—zero-hour for an "*engine-out*" World Record attempt. Three men huddled by a new twin Apache, checking maps, weather data. Time, 5:21 a.m. Then: "Okay, Dick—*now or never.*"

Dick Jagitsch—sales manager for Arkansas Aviation Sales, Inc., Piper distributors for Arkansas—taxied to left of center, pulled a mag check. No burnout necessary. He jotted in his personal log:

"Wind, calm. Temp, 78°. Humidity, 90. Altimeter, 30.01. Fuel, 108 gals. *Gross weight, 3,170 lbs.* Total time left engine, just 12½ hours. Right engine, *none—I left the prop behind.*"

Jagitsch opened throttle. The twin Apache—one engine straining forward, the other dead—moved down the Little Rock Municipal Airport runway, gathered speed. Slight yaw to starboard . . . 600 feet down, now, where an Apache normally breaks ground . . . no rudder "feel" yet. Jagitsch waited. Then—point-of-no-return . . . rudder beginning to "bite" the airstream . . . full throttle . . . end of the strip coming up . . . 3,500 feet down . . . *now!* The "Arkansas Traveler" lifted gently, climbed-out painlessly at 95 mph, banked into the morning mists. Jagitsch switched from left main tank to right auxiliary, took out a handkerchief, wiped his brow.

"We left this one behind—but we had a 'secret weapon' in the other engine!" Left to right: David Feltus, Pilot Dick Jagitsch, Jimmy Woodard.

Final briefing—(l/r) Woodard, Jagitsch and Feltus.

"Arkansas Traveler," on the way to new World Records in distance and time-aloft, one prop removed and the spinner taped to show it's not revolving . . . the other engine fired by Champion's new REM-40-E *Foul-Resistant* spark plugs, making possible prolonged, low-power, "cold-engine" operation.

Pulling this 3,170-lb. load from off-center was a single four-cylinder engine rated at 160 horsepower—less hp than Jagitsch had under the hood of his car! Firing this 160-hp Lycoming was what Jagitsch had told me was "a secret weapon that could make or break this flight"— eight *very unordinary* spark plugs.

"Herb, you've had long experience as a test pilot . . . you know very well what would happen if we held this light twin to *low-power*, '*cold-engine*' operation all day. We'd foul plugs royally! Yet, to beat the records set by bigger, more powerful twins flying *fast* and *hot* to stave off plug-fouling, we'd have to hold power back—'way back!—to keep our light twin up long enough to go the distance on only 90-some gallons. Nobody had ever attempted such continuous and prolonged cold-engine operation. But Herb, when Champion announced it had successfully tested a really *foul-resistant* spark plug, we figured 'why not *try* the first low-power endurance run in aviation history—on one cold engine and one dead one?' "

Jagitsch had cylinder-head temperature gauges rigged fore and aft to monitor this low-power marathon . . .

Two hours went by. Jagitsch's tensions of six weeks eased. But, prematurely. A 20-knot headwind set in. By 2 p.m., Jagitsch was an hour behind schedule.

By mid-afternoon, he was bucking serious headwinds and blinding rain as thunderstorms raked his measured course around Arkansas and Tennessee. More precious time, fuel, lost. VFR navigation at 1,000 feet—a nightmare. Cylinder-head temperatures—"dangerously cold" as Jagitsch doggedly held back power to conserve fuel. How long now before *some* plug-fouling, misfiring? He'd never make the record if he had to add power, heat . . . he listened intently, apprehensively, to the lone engine. Headwinds, pounding rain picked up . . .

At Little Rock, the owners of Arkansas Traveler—David Feltus, President, and Jimmy Woodard, Vice-President, Arkansas Aviation Sales—likewise were in a cold sweat. At a blackboard they charted progress and remaining fuel, relayed by FAA check points, and fed continuous advisories to Jagitsch. But when the weather bureau warned that Jagitsch was heading down a solid alley of worse thunderstorms, they couldn't raise him by radio! Feltus made a decision, called Woodard to a map . . .

Woodard took off in a 250 Comanche, intercepted the "peg-legged" Arkansas Traveler, told Jagitsch to swing north . . .

Twelve hours-26 minutes after take-off, Jagitsch eased his gimped twin down. Momentarily ignoring cheering crowds, swarming newsmen and TV cameramen, he scrawled in his private log:

"Fuel—93 gals. consumed, 15 left. Max. altitude, 3,000; min., 600. Engine *—smooth as silk*. Cylinder-head gauges indicated 'cold' all the way—12½ hrs. at very low power! Mystery why *no* misfiring, fouling. Plugs must be heavy with lead/carbon, but maybe not like on standard plugs."

Jagitsch got out. Feltus, Woodard and Arkansas Secretary-of-State C. G. "Crip" Hall rushed forward.

"Jagitsch," said Feltus, "you and that wonderful ex-twin of ours just set a World Record—1,304 miles *with one engine dead*. As you know, only two men in aviation history had attempted it before you—and they were putting the *heat* to longer-range, more *powerful* twins. What's more, you were up almost *twice as long*—another World Record!"

Later, Jagitsch—more amazed the more he thought about his "silk-smooth engine mystery"—excused himself, got a wrench, pulled the spark plugs. His last log entry:

"New REM-40-E Foul-Resistant Champions—*clean as a whistle! Self-cleaning and foul-resistant on a long, cold-engine haul where ordinary plugs would have grounded us.*"

CHAMPION SPARK PLUG CO.
TOLEDO 1, OHIO

Glad the hours of anxiety are over, Mrs. Dick Jagitsch welcomes her pilot husband back from 12½ hours "upstairs" with one engine dead.

Symbolically, when Jagitsch was presented this trophy commemorating his World Record flight, he accidentally dropped it and the right wing and engine broke off—the same engine that was inoperative during the actual flight.

rkansas Secretary-of-State C. G. "Crip" Hall (r) resents "Arkansas Traveler Certificates" to (l/r) Woodard, Jagitsch and Feltus. Rarely are citizens of the tate awarded this honor.

"Sunrise, Aug. 1, 1959—zero-hour for an '*engine-out*' World Record attempt. Three men huddled by a new twin Apache, checking maps, weather data. Time, 5:21 a.m. Then: 'Okay, Dick—*now or never.*' "

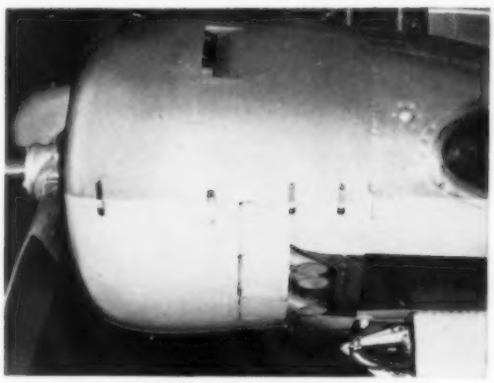
An Oasis...

for those who want the best in modification service

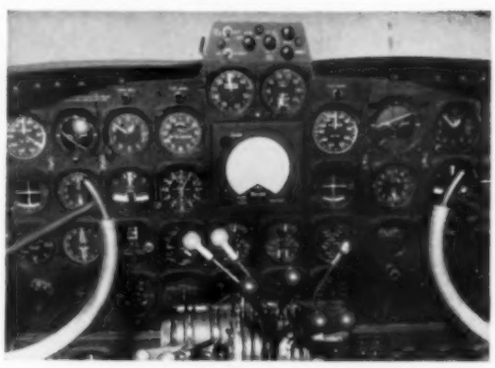
...that's OHIO AVIATION

All Beechcraft Modification Services Available

For many years Ohio Aviation has had the reputation for supplying comprehensive modernization and modification services to private and business plane owners. Recently added—a number of Beechcraft approved and engineered modifications that provide better appearance and increased performance. Here are a few of the modification and modernization services available at Ohio Aviation. We will welcome the opportunity to discuss them with you. For information write or call Charles Groff or James Speer at Ohio Aviation—TW 8-4646.



Super 18 Short Exhaust Stacks—reduce vibration, and eliminates back pressure.



Complete testing and maintenance for all types of radar. Service by factory trained technicians.

THE OHIO AVIATION CO.

Dayton Municipal Airport
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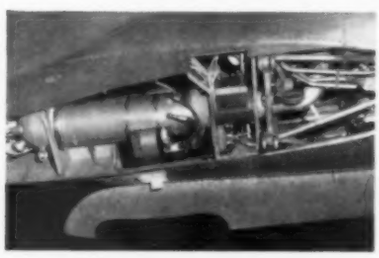

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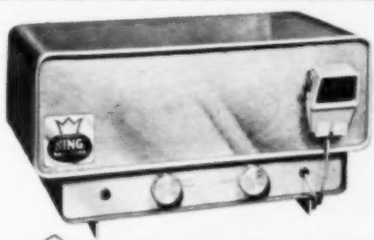

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Commercial Helicopters In Busy Growth Era

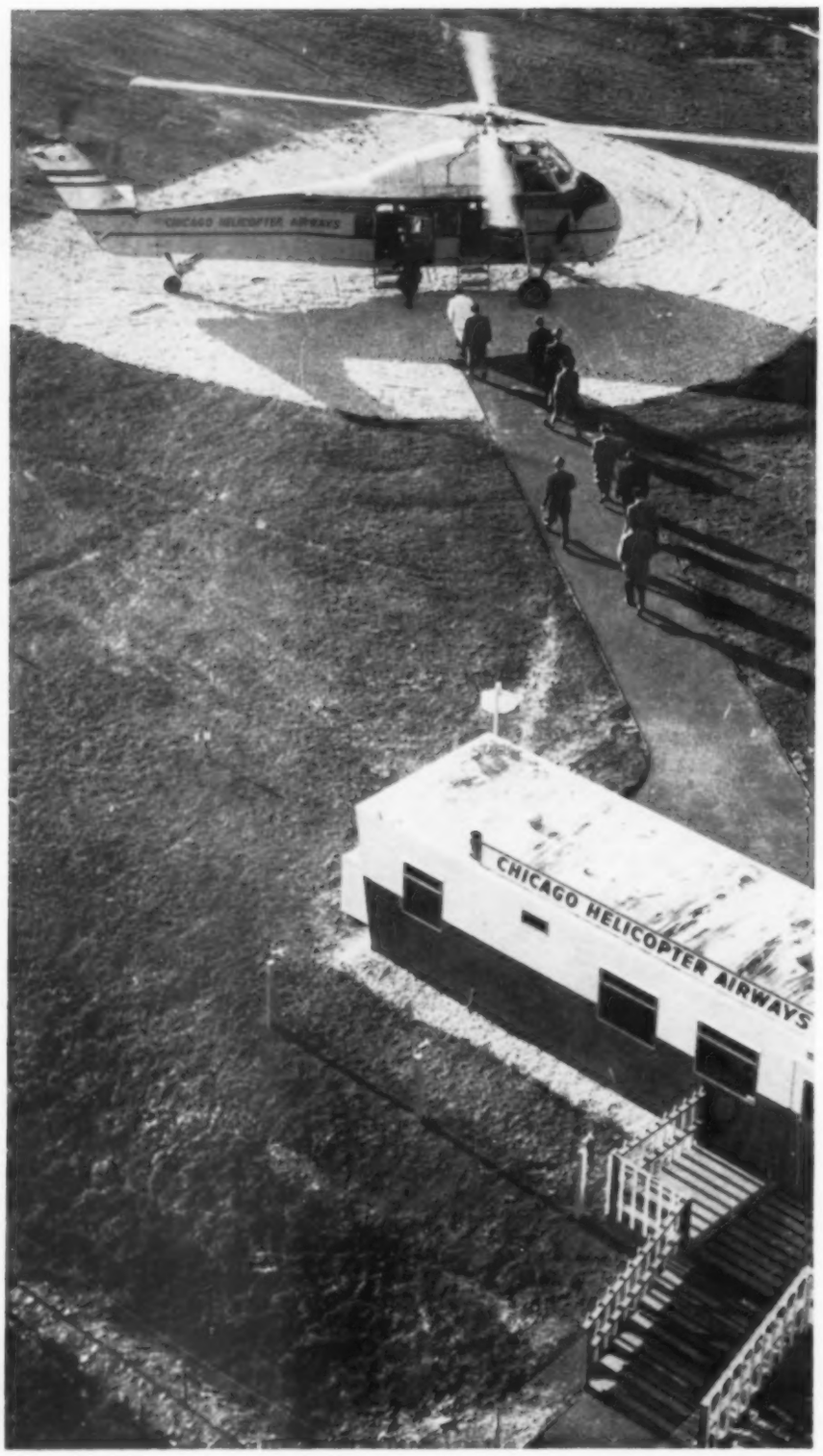
By TOM ASHLEY

NUMEROUS new developments throughout the helicopter manufacturing and operating industry, producing significant advancements for large, medium and small helicopters, provide optimistic prospects for 1960-61 commercial helicopter progress.

Only a few short years removed from its military beginnings and struggling successes in wilderness areas of the world, this still-young industry's strides are more impressive than at any time during the Fifties and the onrushing Sixties will bring giant steps of progress right from the start — production-line multi-turbine transports, advanced versions of pioneering turbine-powered medium copters, more powerful utility machines, 1,000-hr. dependability, and new high-performance small, personal-type copters.

In the field, commercial operations are expanding at a rate difficult to keep up with. FLIGHT MAGAZINE estimates there are approximately 700-750 commercial copters at work throughout North America, with 190-195 operators flying this fleet approximately 450,000 hrs. during 1959 to gross more than $35,000,000 in operating revenues. This estimate is based on reports from leading operators, trade associations and manufacturers and reflects an impressive increase over 1958, for which FLIGHT MAGAZINE estimated a year ago that 130 operators were flying 550 helicopters. Our figures include Canada and Mexico as well as the U. S. For the U. S. alone, the Aerospace Industries Association's Helicopter Council recently estimated 156 commercial operators with 631 helicopters during 1959. Included were 102 executive corporate copters, 20-25% more than in 1958, and 63 copters operated by 27 government agencies (local, state and national) as contrasted to only 30 machines operated in 1958 by 19 government agencies.

A year ago the commercial field included over 400 Bells, 78 Sikorskys, 26 Hillers, 21 Vertols, 5 Alouettes, 3 Kamans and 2 British Westlands. But as of Dec. 1, 1959, over 200 new deliveries had swelled that total, most



HELICOPTER COMMUTER SERVICE is expanding rapidly in Los Angeles, Chicago and New York, where scheduled copters speed jet airline and other passengers above crowded city street traffic. Here's a Chicago Helicopter Airways S-58 boarding morning commuters in Winnetka, Chicago suburb. CHA flies 137 schedules daily, carried 200,000 passengers in 1959, will boost this to 300,000 in 1960.

—(Sikorsky Photo.)

of the 1959 sales being Bells (no figure released), 60-odd Sikorskys, Hillers (no figures released) and 18 2-place Brantly B2's.

Bell Helicopter, which produces more commercial units than any manufacturer and now has over 1,000 commercial helicopters representing it around the world (excluding U. S. military but including all exports), has been delivering about $10,000,000 worth of commercial helicopters and parts annually for the last several years. This figure was slightly higher for 1959 and is expected to register an impressive gain in 1960. Forty-five per cent of Bell's customers in 1959 were new, buying Bells for the first time. They included banks, real estate operators, sheriffs' departments, state highway patrols, construction firms, industrial firms and individuals — in addition to commercial operators such as the world's largest fleet operators including Okanagan in Canada with 38 Bells, Petroleum Helicopters in Louisiana with 38 Bells, Helicol in South America with 22 Bells, Rick in California with 21 Bells and a brand-new large operation, Autair of Montreal with 13 Bells.

Hiller Aircraft sold more 3-place commercial copters during June-December, 1959, than throughout 1958. Sikorsky delivered 9 S-55's and 56 S-58's during 1959. Republic, marketing turbine-powered Alouettes commercially, delivered 8 machines in 1959 after making 5 deliveries the previous year. Hughes Aircraft plans large-scale marketing and production during 1960 for its newly-certificated little 2-place, 180-hp., $22,500 Model 269A, which was impressive in Army evaluation at Ft. Rucker and TATSA service testing.

In the transport helicopter category, multi-turbine Sikorsky and Vertol models were perfected to the point where production was launched with multi-million-dollar orders from scheduled helicopter airlines in New York, Chicago and Los Angeles. These 25-passenger airlines make practical for the first time a rotary-wing equivalent to the DC-3 and a far-reaching impact on local and metropolitan passenger transportation by copters is expected not only in the three big population centers which will get them first but ultimately in other areas awaiting perfection of a practical formula.

In addition, there were important new and large contracts in 1959 for military helicopter production and development by Sikorsky, Bell, Vertol and Kaman while the armed forces pushed significant new weapons and other mission developments for expanded helicopter employment. Military choppers are now being armed for devastating new firepower tactics supplementing the copter's busy but more prosaic role in transportation and reconnaissance. General Electric and Lycoming have reached production status with their new shaft turbines in the 1,000-2,000-hp. category, Pratt

Current Production Commercial Helicopters

Factory Data, Dec. 1, 1959

Make and Model	No. Places	Hp.	Gr. Wt., Lbs.	Useful Ld., Lbs.	Fuel, Gals.	Cr. Spd., Mph.	Price
Bell 47G-2	3	*200	2,450	895	43	89	$ 40,500
Bell 47G-3	3	†225	2,650	1,111	43	105	44,500
Bell 47J-2	4	‡240	2,850	1,150	47	100	72,500
Brantly B-2	2	180	1,600	620	30	100	19,950
Hiller 12E	3	305	2,700	1,000	46	87	59,950
Hughes 269A	2	180	1,550	635	25	85	22,500
Omega BS-12D Twin	5	520	4,850	1,450	80	80	79,950
Republic Alouette II	5	**400	3,300	1,426	153	106	88,650
Sikorsky S55	7	600	7,500	2,250	185	91	151,200
Sikorsky S58	12	1,525	13,000	5,325	290	98	267,000
Sikorsky S61 Twin	28	2,100	18,746	5,000	390	127	650,000
Sikorsky S62	9	730	7,500	3,159	182	115	262,000
Vertol 44	19	1,425	14,350	5,360	300	101	279,800
Vertol 107-2 Twin	27	2,100	18,400	8,225	360	150	524,000

NOTES: *Derated 260-hp. Lycoming VO-435. †Turbosupercharged Franklin 6VS-335 rated 225 hp. to 15,000 ft. ‡Derated 305-hp. Lycoming VO-540. **Turbomeca Artouste IIB-1 shaft turbine. Sikorsky S61 uses 2 GE T58-6 shaft turbines rated at 1,050 shp. Sikorsky S62 T58-6 derated to 730 shp. Vertol 107-2 is priced at about $400,000 plus 2 GE T58-6 turbines, which cost $62,000 each.

NEW TWIN-TURBINE HELICOPTER TRANSPORTS now in production will enter scheduled airline service late in 1960. Above is mockup of Sikorsky S61, below is Vertol YHC1A, production version of which is commercial Vertol 107-2 airliner. Chicago Helicopter Airways has ordered 6 S61's, Los Angeles Airways 5 S61's and New York Airways has option on first 5 Vertol 107-2's. Both airliners carry 24-28 persons in DC-3-type cabin and cruise 127-150 mph.

—(Sikorsky and Vertol Photos).

NEWEST COMMERCIAL COPTER ON MARKET is this 2-place, 180-hp. Hughes 269A, which has 635-lb. useful load at 1,550-lb. gross weight and features mechanical simplicity and high performance. It sells for $22,500.

—(Hughes Aircraft Photo.)

HIGH-PERFORMANCE HILLER 12E is finding favor among operators in mountainous areas with its 305-hp. Lycoming engine and 1,000-lb. useful load at 2,700-lb. gross weight. This 3-place $59,500 12E hauled 19 tons of building materials in 7.5 hrs. to a building site on Mont Blanc 9,500 ft. up in the French Alps. Bob Boughton of Hiller piloted it.

—(Hiller Photo by Jean Brissaud.)

& Whitney is developing a new 500-hp. turbine and Aircooled Motors has licensed its new turbosupercharged 6-cylinder copter piston engine, which is rated for 225 hp. from sea level up to 15,000 ft. and is the most significant helicopter power plant development since the turbines made their appearance. Allison Division of General Motors is developing a 250-hp. turbine with first application scheduled in a Bell utility copter and expects it to compete with piston engines in price.

Commercial pricing has been firmed for the first time for the 1,050-hp. GE T58-6 turbine — it is quoted at $62,000 by Sikorsky for its single-turbine S-62 and twin-turbine S-61, the latter being quoted at about $650,-000 complete while the competitive twin-turbine Vertol 107-2 is quoted at approximately $400,000 plus cost of the two T58-6's.

With this article is a FLIGHT MAGAZINE tabulation of current production commercial helicopters with factory data. In it are 14 models being produced by 8 manufacturers. They range from the 2-place, 180-hp., 1,600-lb., $19,950 Brantly B-2 up to the big 25-28-place, 2,100-hp., 18,-746-lb. $650,000 Sikorsky S-61.

New Bell Developments

Bell Helicopter Corp. is adding a new commercial model for 1960, the 3-place 47G-3, has gone to all-metal rotor blades on all models, and is developing a new advanced "B" version of its pioneering HU-1A turbine-powered military utility copter. The new 47G-3 features Aircooled Motors' new 225-hp. turbosupercharged Franklin 6VS-335 engine for unprecedented performance and load-carrying capabilities at altitudes up to 15,000 ft. It will sell for $44,500, which is $4,000 more than the highly-successful 47G-2 with 200-hp. de-rated Lycoming VO-435, and has an 1,111-lb. useful load at 2,650-lb. gross weight.

Improvements to the popular $72,-500 4-place Model 47J-2, powered by a 240-hp. de-rated Lycoming VO-540 and having a useful load of 1,150 lbs. at 2,850-lb. gross weight, include a horizontal stabilizer which replaced the controllable elevator, a push-pull throttle control, tinted glass in cabin doors, key-lock for baggage door, ash-

IMPRESSIVE TWIN-ENGINE HELICOPTER PERFORMANCE has been demonstrated by new 5-place Omega BS-12D powered by two 260-hp. Lycoming O-540-F1B5 engines and priced at $79,950. A miniature flying crane, it carries cable-suspended loads between cab and main wheels, having 1,450-lb. useful load at 4,850-lb. gross weight. It is in production at New Bedford, Mass., with first delivery awaiting final FAA certification in near future.

—(Omega Aircraft Photo.)

Military copters are widely used for cable-suspended loads. Here's a Sikorsky retrieving a Ryan jet target drone during gunnery tests. Drone will be repaired for more flights.

—(Sikorsky Photo.)

trays for each cabin door, clothes hangers and re-routed headset cordage. The popular 47G-2 has new metal main rotor blades, push-pull throttle system, blue-tinted bubble and door glass, improved cabin ventilation and defogging with sliding windows in cabin doors and dual auto-type rubber-bladed fans on instrument console, two ash trays on console, optional baggage compartment with lock and rotating beacons as part of the night-flying kit. The $40,500 47G-2 has 895-lb. useful load at 2,450 lbs. gross.

Development and future production of an advanced "B" version of the turbine-powered Army HU-1A utility copter are included in contracts totaling $26,000,000 received by Bell, mostly for follow-on output of the HU-1A. Harvey Gaylord, Bell president, said increased performance and payload are the features of the new HU-1B, which will incorporate a modified Lycoming turbine and an improved rotor system and with a transport configuration carrying crew of 2 plus 8 passengers. It will have a 1,000-hp. Lycoming T-53-L-5 to replace the 770-hp. Lycoming T-53-L-1A in the HU-1A. New rotor blades will be of the same diameter as formerly but will be of honeycomb construction with increased chord for the additional horsepower. All components are designed for a minimum overhaul life of 1,000 flight hours and simplified field maintenance, the same as for the HU-1A.

HELICOPTER VERSATILITY in worldwide commercial activities includes cable-hauling of 660-lb. loads of valuable touchstone mineral by Scancopter Bell 47J Ranger in rugged Norway coastal hills (above) and crop spraying by Helicol Bell 47G-2 in Colombia, South America. —(Bell Photos.)

Omega Small Twin Ready

Increased usefulness for utility-type helicopters features a new design being marketed by Omega Aircraft Corp., New Bedford, Mass. Bernard Sznycer's Omega BS-12D mounts two 260-hp. Lycoming engines on a crane-type airframe with a 4-place cabin out front and a pod-cargo area beneath the main rotor between the cab and the main landing gear. It has a 1,450-lb. useful load at a gross weight of 4,850 lbs. and can handle 1,155-lb. pod loads.

First multi-engine small copter, the

(Continued on page 46)

FIRST TURBINE COPTERS are French-built, 5-place, 400-hp., $88,650 Alouettes marketed by Republic Aviation, which has delivered 13 including 2 to Coast Rotors at San Diego (below). Cable load is shown at left. Photo at right shows torpedo-carrying Alouette operating from destroyer fantail in anti-sub tests. —(Republic Aviation Photos.)

New Bell 47G-3 With Turbosupercharger For Altitude

A NEW Model 47G-3 commercial helicopter, featuring a turbosupercharged Franklin engine rated for 225 hp. from sea level to 15,000 ft., has been announced by Bell Helicopter Corporation after prototype testing exceeded original performance expectations by 50% in unheard-of accomplishments. Atop 14,110-ft. Pikes Peak, with density altitudes of 15,000-17,000 ft., it became the first helicopter to lift its own weight at any such height, first to make power-off autorotational landings there and first to make 30 landings in a single day there.

Bell says the new 47G-3 has a service ceiling "in excess of 23,000 ft., hovering ceiling in ground effect exceeding 18,000 ft., and hovering ceiling out of ground effect exceeding 14,500 ft." At 15,000 ft. it climbs 700 feet per minute.

With 6 men aboard, the 3-place Bell 47 at left is hovering atop Pikes Peak. It also demonstrated a power-off autorotational landing there. Turbosupercharger gives it sea level performance at 15,000 ft.

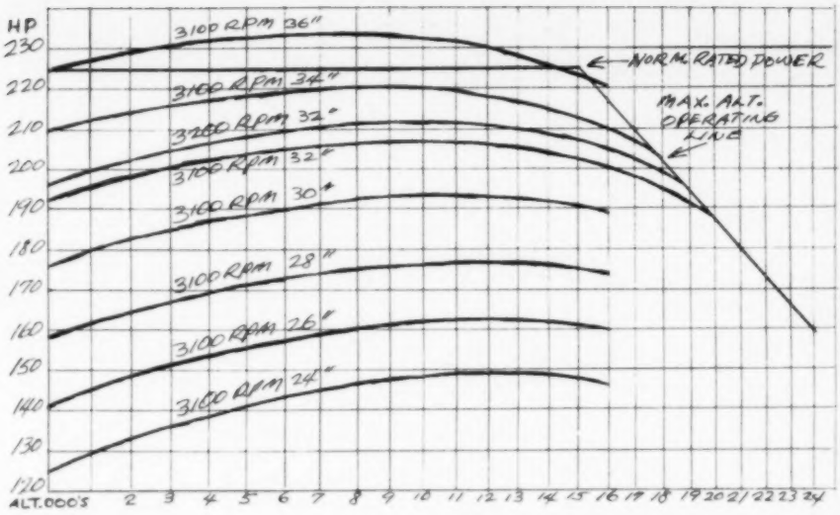
—(Bell Photos.)

Priced at $44,500, which is $4,000 higher than the 47G-2 from which it was developed, the G-3 is longer and its rotor system is interchangeable with that of the 4-place Model 47J Ranger. Its useful load is 1,110 lbs. at 2,650-lb. gross.

The new 6VS-335 engine has a rugged, low-cost AiResearch industrial turbosupercharger produced for tractors. This small unit adds less than 40 lbs. to the engine, whose complete installed weight of 360 lbs. is 56 lbs. less than that of the 47G-2's unaspirated sea-level Lycoming. It is not the same Franklin as its unsupercharged predecessor — the new Franklin has new pistons, cylinders, valves, camshaft and other parts. It uses the same 18-mm sparkplugs used in the big turbocompound Wright engine on the DC-7 and its high BMEP of 171 compares with the Pratt & Whitney R2800's cruise BMEP of 151.

Bell uses a manual control system for manifold pressure as required, first by throttle and then by gradual closing of the exhaust waste gate, the pilot not knowing whether the action is by throttle or waste gate because of the linkage.

Plans call for retrofitting kits with which Bell 47G-2's in the field can be equipped with the new engine and Aircooled Motors is developing a propeller version of the turbosupercharged engine for fixed-wing lightplanes.



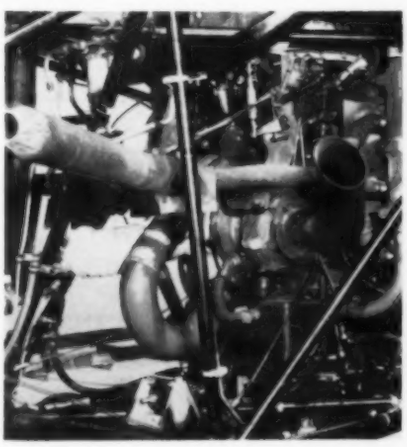
Here's Aircooled Motors power curve for altitude performance of its new turbosupercharged Franklin 6VS-335 helicopter engine, for standard conditions at compressor inlet and turbo exhaust and with full rich setting using 100-octane fuel. Engine has 335 cu. in. displacement with bore and stroke of 4.5 by 3.5 ins. and weighs 360 lbs. including starter, carburetor, ignition system, fuel pump and turbosupercharger with complete exhaust system. It is FAA certificated and is in production.

Turbosupercharger For Power To Spare

By V. J. MECCA
Service Manager, Aircooled Motors, Inc.

IT is our great pleasure to introduce the newest major development in helicopter powerplant, the turbosupercharged 225-hp. Franklin 6VS-335. The first approved compound-gas-cycle aircraft engine, it fulfills the long standing requirement in its horsepower class for a reliable, light, uncomplicated, high-performance engine capable of producing rated hp. at high ambient temperatures and altitudes. The hp. at altitude per cubic inch of displacement and per total installed weight establishes the 6VS-335 as the performance leader in this field.

Despite the resemblance of the 6VS-335 to former models, it should not be concluded that the new engine is the familiar 200-hp. model with additional accessories. The original concept of the 6VS-335 included a requirement that it be interchangeable in existing airframes and utilize as many existing engine parts as possible.

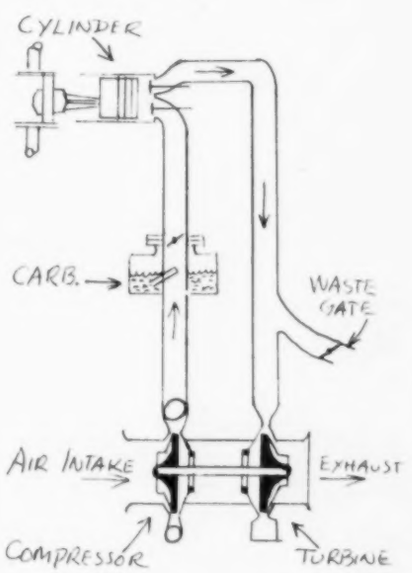


Turbosupercharged Franklin in Bell helicopter test installation is at left. Engine exhaust has test reduction nozzle; large exhaust is from turbine, shown at center. Air from compressor is ducted in large curved pipe to carburetor. Small bent tube at center carries lube oil from crankcase to turbine impeller bushing. Schematic sketch at right diagrams waste gate for diverting exhaust to turbine for compressor drive without gearing.

Having met these requirements the 6VS-335 is very misleading appearancewise, since many of its components are specifically designed to meet the conditions of supercharging.

To accept the performance offered by the Franklin 6VS-335, and to realize optimum service, one must realign his concept of aircraft engines in this class. The 6VS-335 is a marked departure from the conventional light-plane engine. Franklin long ago recognized that scaling up the naturally aspirated engine for more power was not the answer. Large displacement means excess bulk and weight, which severely penalizes aircraft performance. It is obvious, and particularly so in light of current pure turbine and turboprop development, that piston engine development must proceed toward more horsepower from reasonable displacement and size. The classic high performance airline radial engine pioneered a logical development course. It demonstrated that high BMEP can be attained through proper design. The small engine field, however, cannot afford the high power absorbed by internal blowers, or the cost of mechanically compound machines with sophisticated gear trains. In our class of engine, simplicity is a must. Franklin's engineering background with internal centrifugal, mechanically driven centrifugal and positive displacement blowers, and its own turbosupercharger development provided the basis for the 6VS-335 concept.

The 6VS-335 is a most compatible marriage of two machines, a four-cycle internal combustion piston engine and an exhaust-driven turbosupercharger. The engine portion of the combination, while incorporating specific designs required by the union, functions similarly to the familiar aviation piston



engine. The turbosupercharger is a device for supplying compressed air to the engine induction system. It consists of a radial-flow turbine and a centrifugal compressor mounted on a common shaft within appropriately designed housings.

Rather than waste the energy which is available from the engine exhaust, as is done with normally aspirated and internally supercharged engines, the exhaust gases from the Franklin 6VS-335 are passed through the supercharger to spin the turbine. Since the compressor is directly coupled to the turbine the compressor output varies directly with the turbine rpm. The compressor precedes the carburetor in the induction system so that no explosive mixture appears in the compressor.

At sea level rated power, only a small percentage of the available exhaust energy is used to drive the turbosupercharger, the surplus exhaust being discharged to the atmosphere through a duct immediately ahead of the turbine entrance. There is no mechanical connection between the turbocharger and the engine to create vibration or surge problems.

Power is regulated by the carburetor throttle valve and by a waste gate which regulates the flow of the exhaust gas to the turbine. Engine control is accomplished through a mechanical link between the throttle valve and the waste gate which maintains the waste gate in the most open position until the throttle valve is full open. The throttle dwells at full open as the waste gate is closed to produce rated power. The waste gate open stop is preset to produce rated power/speed on a standard sea level day at full open throttle. As a result of the preset arrangement, the turbo speed is sufficiently high at part throttle so that the engine's response to a sudden demand for power is equal to or better than that of a naturally aspirated engine.

The engine power results from a compounded gas cycle which is essentially a closed, self-triggering circuit. More exhaust energy is available than is required to drive the turbine at rated power even beyond critical altitude. The compressor output therefore can be increased by closing the waste gate. A rise in compressor output increases the horsepower which then makes available more exhaust energy which can be used to drive the compressor at a faster rate, and so on, and if not controlled will result in serious engine damage.

The critical altitude limits have been established to provide a safe operating margin. Due to the margin between maximum altitude-horsepower operating limits and the turbo rpm. limit, no turbo-speed-limiting governor is needed. Maintaining the limits will be a matter of pilot discipline. From the cockpit standpoint, the pilot will control the engine exactly in the same manner as with the naturally aspirated engine. Other than observing manifold pressure limits as is done with a de-rated engine no special technique is required.

Atmospheric pressure reduces at the approximate rate of one inch of mercury per 1,000 feet of altitude. A naturally aspirated engine can generate manifold pressure only equivalent to the air density less whatever losses are inherent in the particular air inlet system. At 15,000 feet a naturally aspirated engine produces less than 60% of rated power and therefore must have a sea level rating of approximately 400 hp. in order to deliver 225 hp. at this altitude. The turbocharger is capable of pumping a sufficient quantity of air at the required density to enable the 6VS-335 to maintain rated power to 15,000 feet as illustrated by the power curve. The 6VS-335 can probably exceed rated manifold pressure by 13 inches or more at sea level if the pilot were to continue with the cockpit engine control. At 50 inches m.p. the engine would produce in excess of 300 horsepower. Obviously the 6VS-335 has not yet been developed for this type of operation. No evaluation has been attempted at this output. The operator must abide by the manufacturer's warning against deliberate over-boosting.

During the course of development, the 6VS-335 has accumulated many thousands of hours, has been deliberately (and accidentally) over-temperatured and over-boosted reasonable amounts to test its reliability. When operated within the prescribed limits, the 6VS-335 will reliably deliver performance never before available to general aviation.

During the four years of development of the turbosupercharged engine, special attention was given to those areas which were troublesome on previous models. The 18-millimeter spark plug, the remarkable fuel distribution and the higher inlet temperatures associated with turbocharging, have resulted in an engine that is remarkably free from any tendency toward lead fouling of spark plugs. The reserve of power, which eliminates any need for over speed in critical flight regimes, and strengthened connecting rods are assurance against rod failure. A new exhaust valve and bronze guides have cured pitting and wear problems. Although the discussions of the new engine will quite naturally emphasize altitude performance, it must be apparent that the performance gained at sea level is just as noteworthy. During the performance evaluation, the Bell Model 47G3 helicopter was hovered in and out of ground effect carrying loads equal to the helicopter empty weight.

Procurement of raw stock and processing of machined parts are now under way at Aircooled Motors, Inc. Complete engines will be leaving the assembly line late in December, 1959, and early January, 1960, to meet the production schedule of the Bell 47G3. We have already received firm orders for spare 6VS-335 engines from several operators who will take delivery of the 47G3 as soon as it is available.

MOUNTAIN OPERATIONS ARE WIDELY CONDUCTED BY HELICOPTERS with turbosupercharging opening many new possibilities with sea level performance up to 15,000 ft. This scene shows a Bell 47J operated by Scancopter of Oslo, Norway, servicing a remote weather station atop Mount Fanaraaken, highest Scandanavian peak.

—(Bell Photo.)

Deadly rockets of a wide variety are carried by large and small helicopters in Army Aviation Center firepower exercises. Army's newest utility copter, the Bell HU-1A is pictured above with a Sikorsky delivering a blast of rockets below.

—(Army Photos.)

Whirly Blitz New For Combat

By GEORGE E. HADDAWAY

RANGING far and wide over the sprawling 62,000 acres of the U. S. Army's Aviation Center at Fort Rucker, Alabama, we found last month some of the reasons why Army Aviation is in for a period of growth and development, unprecedented in its 17-year history, even by the hasty application of helicopters and light aircraft to the fighting in Korea ten years ago.

It all boils down to the proposition that we must, in future wars, whether brush type or the Big One, get the soldier off the ground so he can better perform his mission. Now that we are beginning to produce advanced engineering designs with combat capabilities heretofore undreamed of, this goal can be realized. Military planners have long recognized this requirement of airlifting foot troops, even before Korea, and with subsequent troubles all along the Communist borders and in the Middle East it is more imperative than ever to bolster the concept of air mobility for the Army.

At Fort Rucker we found conclusive evidence that Army aircraft offer the best possible means for a positive advance in the mobility of basic maneuver elements. In Germany last summer we flew over a thousand miles in helicopters looking into every facet of Army Aviation in the European theatre. At Bad Toelz, below Munich, we observed how vital the whirlybirds were on maneuvers that simulated guerilla warfare with hostile elements of infiltration — the most likely type of trouble to expect from our peripatetic enemy. Today the capabilities of Army Aviation have been extended far beyond the old concept of "aerial observation posts" and "taxi service." From the original job with Piper Cubs back in 1942 of providing support only for the artillery, Army Aviation is now incorporated in three combat arms and four services.

Next month, following considerable experimentation at Fort Rucker and with a green light from the Continental Army Command, armed helicopters will go into actual field testing by the Second Infantry Division at Fort Benning, Georgia, and shortly thereafter troop trials will begin with an armed helicopter company in the Second Armored Division at Fort Hood, Texas.

The idea of armed helicopters is not new. Our military intelligence has photos of armed Russian helicopters. In 1957 the Army was successful in putting together an Aerial Combat and Reconnaissance Company and a Reconnaissance and Security Company as experimental units to help do the finding and fixing of the enemy for the ground forces as well as packing a punch of fire power on a fluid battlefield without large concentrations of forces so characteristic of all previous wars. The threat, or rather the very existence and expected use of nuclear weapons, makes dispersion more mandatory for success and survival than ever before. Dispersion today requires the broad use of aircraft — both rotary and fixed wing.

So it was a natural development that rockets and machine guns were finally mounted on helicopters, which alone have the capability of flying at or below tree-top level to stay out of the radar horizon, to pop up, observe, fire if necessary and drop down again into protected terrain pockets or woods. In essence they are a "sky cavalry" with mobility never before dreamed of.

When we asked about the choppers' vulnerability to ground fire, our escort officer replied with his own question: "Who or what isn't vulnerable on a battlefield these days?" You can't hit what you can't see and for the most part the choppers are exposed only momentarily. To prove the point two Bell H-13's approached us during a demonstration from opposite sides of the Rucker firing range, a mile or two away and below tree top level. One copter was observed twice during the five minute "approach" while the other was seen to rise once in full sight and disappear only to pop out in the open on our flank to let loose 1,200 rounds of 50 calibre blank

tracer ammunition at the target, which happened to be our observation group.

In another demonstration, a Vertol H-21 peeked over a hill and fired 24 lethal 4.5 rockets into a bunker, then took speedily off and out of range. The day was overcast out on the red Alabama hills and we readily understood from the demonstration how futile it would be for the supersonic jets of the Air Force to lend much ground support of any nature on such a battlefield under such conditions. Here, we mused, is the crux to the age old problem of whether the ground Army is to have its own "air force." The Army simply isn't interested in the argument and we now understand why. Let the high-flying Mach-plus boys fight for control of the air, while the Army, with its own machines, takes to the air only in the extension of ground combat. As one officer puts it, "The primary objective in any conflict is real estate."

Both of Army Aviation's major functions — surveillance and mobility, are better served by armed helicopters than un-armed machines, especially since in modern warfare, striking distances will be measured in miles instead of yards.

Small reconnaissance-type Bell carries missiles, too, in Army tests. Tactics call for copters to maneuver below tree tops, rising above cover only to deliver firepower, then dropping back down behind cover to maneuver elsewhere for another launching. —(Army Photo.)

The Vertol above not only hits and suppresses enemy ground forces with rockets but carries assault troops, with machine guns in doors and some of the windows to cover unloading troops. Big twin-engine Sikorsky carries missiles and launcher into strategic position for mobile assault units. —(Army Photos.)

Aerial combat reconnaissance performs both aerial and ground reconnaissance, and counter reconnaissance; it acts as a covering force for advance, flank or rear guard action; it detects, isolates and fixes targets for supporting forces or weapons; it provides rear-area defenses to include anti-guerilla, anti-infiltration and anti-airborne forces; it performs economy-of-force missions — the use of temporary forces in blocking roles; and it provides armed aerial escort for Army "airmobile" forces.

There is no intention for armed helicopters to replace anything. The old horse cavalry never was used to attack heavily defended positions, nor will the "air cavalry" be so utilized. But you do locate the target and can attack with major combat force. The addition of firepower to the versatile helicopter's capabilities in communications and mobility is a tremendous step forward.

Today a conventional infantry division has a regular complement of 50 aircraft. The Aerial Reconnaissance Company, which includes elements of command, reconnaissance, troops, weapons and supply and medics, would be integrated into the Division over and above its present aviation strength. The turbine-powered high-priority Bell HU-1, carrying plenty of firepower with rockets and guns, is the command, reconnaissance and weapons machine while the Sikorsky and Vertols are the basic machines in troop lift, supply and medic craft. It is the first time the Army has been able to approach a weapons system concept in which firepower can be designed for the specific helicopter at its origin.

All sorts of interesting developments are coming from the weapons system approach. A typical example is an experiment in the use of closed-circuit TV for guidance. A new lightweight radar navigation system has a nine-inch-square map display which shows the pilot a visual picture of his aircraft's position and flight track by a moving pointer against air or grid maps. Other features include an extremely accurate "free gyro" which gives accurate navigation when magnetic reference becomes unreliable and a movable tape which provides speed and rate of climb information together with an auto-navigator which "remembers" flight information. Since lightweight equipment is a must for the types flown by the Army it is readily obvious what these developments might mean to general aviation when perfected.

Likewise, airborne lightweight TV

(Continued on page 46)

With 184 Hillers, this giant heliport is a beehive of primary pilot training activity at the U. S. Army's helicopter training school at Camp Wolters, Mineral Wells, Texas. Contract training of 1,000 pilots annually is conducted by Southern Airways at the base, world's largest helicopter pilot school. —(U. S. Army Photo.)

Helicopter Pilot Mill

CIVILIAN contract pilot training isn't new but the U. S. Army will tell you it's worked wonders for them both in fixed-wing and helicopter primary instruction of Army pilots.

At Camp Wolters near Mineral Wells, Texas, Southern Airways Company is doing all the Army's primary helicopter pilot training in the world's largest helicopter training school. Established three years ago, the school turns out about 1,000 pilots annually and to date has had a perfect safety record — not one fatality.

The school boasts 184 Hiller two-place trainers which average more than 7,000 training hours per month with 420 civilian employes, including all instructors. Hiller H-23D trainers are replacing the old B and C Models for a higher aircraft availability rate and reduced operating and maintenance costs.

Southern Airways conducts all flight and ground school training, maintains all aircraft, vehicles and equipment, operates the heliports, ground transportation, fire and crash protection, radio communications, safety program and weather service. The Army furnishes the aircraft, vehicles, equipment, supplies, buildings, grounds, utilities, etc., administers the contract and the students, conducts military training, faculty boards and Phase I of Cargo Course, and furnishes military supervision of all training, maintenance and the safety program.

These photos show activities at Camp Wolters. At lower left, military pilot with student after check ride, while student takes off from hilltop in rough terrain (upper right). Instructor introduces new class to Hiller trainer in view below. —(U. S. Army Photos.)

TWO GREAT BELLS.

LOOK FOR THESE FEATURES IN THE NEW 1960 BELL 47G-2

Metal main rotor blades
New heavy-duty tail rotor gear box
Improved ventilation and defogging
New free-action throttle
Longer life engine mount (1200 hours)
Relocated safety belts (more seating room)
Contoured seat cushions
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Tinted bubble and doors
Baggage compartment kit
Rotating beacon
Horton & Horton custom upholstery

WORKHORSE OF THE WORLD BELL'S 1960 47G-2

No other light-utility helicopter can touch the famous Bell 47G-2 — it's the champion of them all. Today this rugged little workhorse serves twice as many business travelers, oilmen, agriculturists, loggers, construction and powerline specialists, *as do all other makes of helicopters combined.* Besides being the lowest priced three-place FAA-certified helicopter — and one of the most economical to operate and maintain — the 1960 47G-2 offers twenty-five engineering improvements. Added to the "G-2's" already renowned performance characteristics, they make it unquestionably the world's best helicopter buy. Get in touch with Bell, or your nearest Charter Operator, for a test ride, *soon.*

BELL HELICOPTER CORP.

BELL'S 1960 47J-2 EXECUTIVE LIMOUSINE FOR BUSINESS AND INDUSTRY

Here's the most luxurious all-purpose helicopter in the world — first choice of presidents, widely favored by government and business in 52 countries. This popular four-place 1960 model offers Bell's timeless precision workmanship (backed by 2,500,000 hours of performance). But more, it offers seven new features that make this 47J the most dependable, most comfortable-riding helicopter you can buy. In your work, in your personal travel, if it's mobility *and* prestige you want, here's a helicopter with speed, range and impressive looks to back your judgment to the hilt. Let us arrange a demonstration of the incomparable 1960 47J. Write Bell today.

NEW — IN THE 47J FOR 1960

Lycoming VO-540 engine — more power available
Fixed elevator
New lightweight skid gear
New free-action throttle
Tinted glass doors
Improved carburetor air filter
Induction vibrator for improved starting
Dual breaker magneto

S..GOING LIKE '60!

7G-2

OR[T] WORTH, TEXAS • SUBSIDIARY OF BELL AIRCRAFT CORPORATION

Versatility of multi-turbine flying cranes in military operations is shown in this Sikorsky sketch of troops, weapons, tanks and fuel being maneuvered in combat area.

Flying Crane As Aerial Prime Mover

Recent military demonstrations of Sikorsky S-60 included lifting this tank trailer as copter replaced truck tractor for transport role. It lifted loads exceeding 4 tons.

(Sikorsky Photo.)

ALTHOUGH small and large helicopters have utilized cable suspension for carrying external cargo loads in recent years, the true flying crane became a reality only recently with widespread demonstrations of the Sikorsky S-60 research crane. It proved the concept both successful and practical and is expected to open up a new and promising area for helicopter utilization in commercial and military operations.

Gas turbines, with their power-to-weight advantages over big piston engines, will make possible very heavy load lifting and handling. Sikorsky Aircraft says it expects flying crane payloads to range up to as much as 50 tons with rotor systems and turbines now under development. This scale of flying crane load lifting can revolutionize many commercial and military short-haul cargo transportation methods, freeing streets and roads of heavy prime movers and giving precise maneuverability to bulky as well as heavy loads in both industrial centers and wilderness areas.

But the approach will be made first through the launching of multi-turbine transport helicopters, such as are now in production for scheduled airlines. Sikorsky, for example, is transitioning from its piston-powered S-55 and S-58 small transports into the single-turbine S-62 and twin-turbine S-61 transport, while Vertol is transitioning from its Model 44 into the new twin-turbine Model 107-2 transport. All three of these machines use the 1,050-hp. GE T58-6 turbine. They will become commercially available in late 1960 and during 1961. Sikorsky's first flying crane, the S-64 will become commercially available in 1962.

The Sikorsky crane currently is an exclusively research vehicle. The S-60, powered by two Pratt & Whitney R2800 piston engines, was developed from the twin-engine S-56. Capable of lifting 5-ton loads, the S-60 lifted loads of more than 4 tons in its recent demonstration tour of military installations. This machine, built as a joint project with the Navy, was intended only to demonstrate the ease and efficiency with which a wide variety of bulky loads can be handled. No attempt was made to engage in weight lifting contests, Sikorsky emphasizes.

The pioneering S-60 introduces an entirely new concept for a flying workhorse. It eliminates the conventional cabin structure, being only a bare airframe with a pilots' cab. This minimizes the machine's own weight for maximum payload utilization. It also accomplishes two other major items: (1) It makes possible alternate use of cable-suspended cargo or pod-type

removable cabins for people or cargo and (2) it gives the pilots 360 degrees of visibility for precision flying in all directions, an essential in crane operations where pinpoint accuracy is needed for maneuvering loads in relation to ground placement and obstacles. Helicopters have demonstrated this accuracy by spotting structural steel components to line up with bolt fittings on foundations, for example, and by lowering power line poles into holes.

The S-60's cab provides swivel-seat pilot position so that the pilot can fly while facing forward or rearward. On the recent tour, more than two dozen Army and Marine pilots in extended familiarization flights flew for the first time while facing rearward. But they all said they quickly adjusted to the new sensation. This enables the pilot to see his sling load as he hooks on, maneuvers it and releases it — the pilot is no longer dependent on a man on the ground for hand signals. He therefore can work faster and with more confidence than ever before.

Typical pilot reaction was expressed by Major Joseph Freitas, a Marine pilot. "Facing rearward with the ground moving away from me was the most unusual sensation I've experienced in 16 years of flying," he said at Quantico, Virginia. "I was surprised at how quickly I caught on, though; no strain at all. The crane concept is fine. For the first time a helicopter pilot can see his sling load as he hooks on and lifts it."

Igor Sikorsky, Mr. Helicopter himself, whose VS-300 was America's first successful helicopter and made its first flight 20 years ago last September with Igor at the controls, strapped a platform beneath the S-60 and rode it to determine the feasibility of the crane hauling personnel. A removable "people pod" for 20 persons was then built and attached beneath the S-60, with bungee shock absorbers isolating it from the big machine's vibrations. In carrying the press, VIP's and troops, it won praise for its versatility and its isolation from vibration was cited as a major helicopter breakthrough.

On the basis of experience with the improvised pod, Sikorsky contemplates a finished pod with a streamlined rear section and with the front attaching to the pilots' cab.

While the S-60's weight lifting proved the crane's handling capability with bulky loads of between 4 and 5 tons, multi-turbine flying cranes will have the power available for loads of 5, 10, 20 and up to 50 tons. In addition to far-reaching military developments with such versatility, the big cranes will enable commercial operators to lift truck-size, bus-size and larger loads over surface traffic bottlenecks or obstacles in construction work and cargo transportation.

"The S-64 will fly next year and then we'll see the flying crane come into its own as a prime mover," a Sikorsky spokesman says. "It will prove to be the aerial equivalent to locomotives and truck tractors as well as a universal tactical and strategic vehicle of far-reaching possibilities."

Detachable "people pod" for 20 persons was improvised for military tests and won praise for its freedom from vibration—a copter breakthrough.
—(Sikorsky Photo.)

Hauling fuel drums, Sikorsky S-60 unloaded them without landing with rearward-facing pilot doing job without ground assistance.
—(Sikorsky Photos.)

TURBINE-POWERED KAMAN HU2K for the Navy, powered by 1,050-hp. GE T58 turbine, is undergoing flight tests at Bloomfield, Conn., and will be in production early in 1960. Kaman will certificate HU2K with FAA for possible marketing of commercial 10-passenger version. Kaman Aircraft Corp. in 1959 became first helicopter manufacturer to convert to 100% turbine copter production. It is delivering H-43B Huskies to the Air Force in addition to its HU2K Navy project.

(Kaman Photo.)

FAIREY ROTODYNE, produced in England, is a convertiplane transport shown here demonstrating load lifting with bridge span. Production versions will be delivered in 1964, featuring 55-65-passenger cabin, 200-mph. cruise speed, 650-mile range, two 5,250-hp. Rolls-Royce Tynes for airplane flight and tip jets for helicopter flight. Kaman Aircraft is U. S. licensee, with order for one from Okanagan and option for five from New York Airways.

—(Fairey Aviation Photo.)

HELICOPTER DEVELOPMENT

(Continued from page 35)

$79,980 Omega is in production with an initial batch of ten machines — all on order from customers. William E. Boeing, Jr., Seattle, ordered three, Okanagan Helicopters of Vancouver ordered 3 and one was ordered by the Massachusetts department of public works. Sznycer says all tests by the manufacturer have been completed and the project is now in final stages of FAA certification with the first aircraft ready to deliver to Boeing immediately upon certification. He also offers the machine with turbo-supercharged 225-hp. Franklins and says he is studying the application of the new 250-hp. Allison T63 turbine in a twin configuration with 1,500-lb. payload and a tri-turbine installation with 2,500-lb. payload. Omega flight tests and sales are directed by Robert L. Nields, vice president. Sznycer is chairman; Omega is managed by an executive committee including Sznycer, R. Jacques T. duPont, treasurer, and Harry Payne Whitney II, director.

Hughes Plans Marketing

High performance, mechanical simplicity and low operating and maintenance costs feature the new 2-place, 180-hp. Model 269A which is being marketed by Hughes Aircraft at Culver City, Calif., beginning early in 1960. The 1,550-lb. Hughes has a 635-lb. payload and is priced at $22,-500. First production batch was 7 machines for Army evaluation, which was so successful Hughes decided to launch an all-out commercial project with the little chopper. Bud Kelley, formerly with Bell and lately in charge of Alouette sales for Republic, is in charge of setting up the marketing program. He said he hoped to complete plans early in 1960. The 269A was FAA-certificated last April. All major components are independently removable within less than an hour and maintenance requirements are said to be only one-half man hour per flight hour. Low parts costs include a factory-balanced interchangeable main rotor blade which costs only $250.

VERTOL MODEL 44 WORKHORSE TRANSPORT was delivered last month to Atlas Helicopter Service of Omaha, Nebraska, a new firm which plans widespread operations using Vertols. The tandem 15-19-passenger Model 44 is powered by a Wright Cyclone 9 engine and has a 5,360-lb. useful load at 14,350-lb. gross weight. New York Airways operates a fleet of five Model 44's in scheduled passenger service.

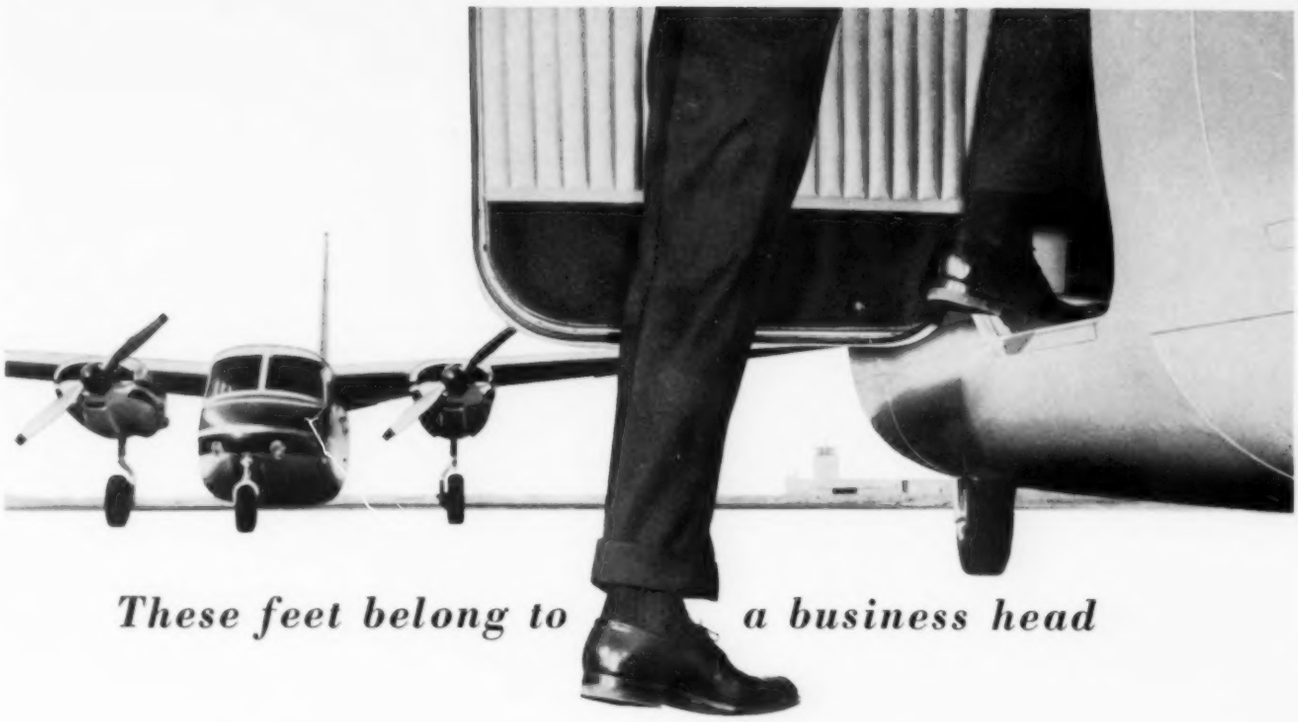
—(Vertol Photo.)

WHIRLY BLITZ

(Continued from page 40)

might be used for general battlefield surveillance, which with radar and infra-red equipment, provides the kind of observation modern battle dispersion over broad areas calls for. As General Richard D. Meyer, Deputy Chief of Transportation for Aviation, recently put it, "An atomic war will be fought by dispersion and diffusion of battle units, by elusiveness and concealment, by feints, thrusts and parries. The best time for maneuvering will be in foul weather and in darkness."

The forthcoming tests at Fort Benning and Fort Hood with armed helicopters point up the U. S. Army's constantly expanding use of rotary craft. Giving real sting to the choppers by the addition of firepower ushers in a new era in Army Aviation and admirably illustrates the ever-widening horizons for an already versatile aircraft vital to the Army's pentomic concept of mobility.



These feet belong to a business head

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Aero Commander with sound reasoning

This practical executive knows that Aero Commander means greater economy—a lower total operating cost per mile—while carrying six of his staff on busy schedules to everywhere they're needed on time and *in time*.

He knows that the Aero Commander is a time-tested aircraft so maintenance is held to a minimum. For instance, hundred-hour checks are less expensive because systems, engines and components are more easily accessible. Add Aero Commander's high performance and these are two of many reasons for this man's choice—and why more than 800 of these modern business twins are serving commerce and industry throughout the world.

Write for *Cost of Operation* data and see for yourself how Aero Commander can serve your company with greater economy.

AERO COMMANDER

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New and larger cockpit of 9,700-lb. Super G18 has new 2-piece glass windshield with greater slant angle and larger side windows.
—(Beech Photo.)

Beech Advancements For 1960

A RESURGENCE in Beech Aircraft Corporation's competitive drive for a larger share of the business aircraft market blossomed last month when the firm launched its 1960 line of seven executive aircraft models — two of them making their first appearance and the other five incorporating important new engineering and design improvements.

This is the largest fleet of Beechcrafts in the company's history and with it Beech expects to skyrocket its commercial aircraft sales volume from over $37,000,000 in 1959, a record, to about $60,000,000 in 1960 for a jump-up of over 50%.

Standing out from many new Beech developments for 1960 are three major projects — (1) the new Model 33 4-place Debonair economy version of the famous Bonanza, (2) a redesigned and more practical cabin with rear stair door for the Twin-Bonanza, and (3) a new big-cabin Queen Air transport scaled up from the Twin-Bonanza.

These, plus impressive improvements for the Bonanza, Travel Air and Super G18, add up to more design progress than Beech has ever undertaken in a single year for the advancement of its business planes. The 1960 Beech line-up on models and prices runs like this:

Model 33 225-hp. Debonair, $19,995.

Rear stair door, new cabin seating with individual chairs and lower cabin floor feature major Twin-Bonanza changes for 1960.
—(Beech Photo.)

Travel Air's new vertical fin and wider horizontal tail are combined with 19-in. rearward extension of cabin interior.
—(Beech Photo.)

Model M35 250-hp. Bonanza, $25,-300.

Model B95 360-hp. Travel Air, $51,500.

Model D50C 590-hp. Twin-Bonanza, $83,000.

Model H50 680-hp. Twin-Bonanza, $95,500.

Model 65 680-hp. Queen Air, $120,-000.

Model Super G18, 900 hp., $126,-000.

Prices remain unchanged over 1959 for the Bonanza and Travel Air but the D50C Twin-Bonanza is up $2,500, the H50 Twin-Bonanza is up $3,000 and the Super G18 is up $3,500.

Model 33 Debonair

Beech not only has come through with an economy version of the Bonanza, wanted for years by dealers and users, but surprisingly held its Debonair price to $19,995 and retained

1960 Beech Business Twins

Factory Data

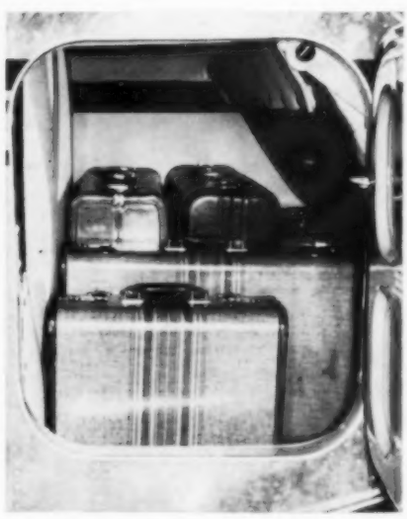
	Model B95 Travelair	Model D50C Twin-Bonanza	Model H50 Twin-Bonanza	Model 65 Queen Air	Super G18
Price	$51,500	$83,000	$95,500	$120,000	$126,000
No. Seats	4-5	6-7	6-7	6-7	7-9
Take-off Hp.	360	590	680	680	900
Gross Wt. lbs.	4,100	6,300	7,300	*7,700	9,700
Empty Wt., lbs.	2,635	4,100	4,480	4,740	5,950
Useful Load, lbs.	1,465	2,200	2,820	2,960	3,750
Useful Percentage of Gr. Wt.	35.7	38.4	38.6	38.4	38.6
Fuel Cap., gals.	84	134	180	180	272
Opt. Fuel Cap., gals.	112	180	230	230	318
Oil Cap., gals.	4	6	8	8	17
Top Spd., mph.	210	214	235	239	233
Cruising Performance —					
(a) Mph.-pct. hp.-alt. ft.	200-75- 7,500	203-70-7,000	213-70-10,000	205-70-10,000	214-66.7-10,000
(b) Mph.-pct. hp.-alt. ft.	195-65-10,500	201-65-9,000	207-65-10,000	200-65-10,000	202-57.7-10,000
Range (a), mi-gals.	.....	.....	.....	1,160-230	1,256-318
Range (b), mi-gals.	1,160-112	1,100-180	1,400-230	1,240-230	1,394-318
Range max., mi-gals.	1,410-112	1,650-180	1,600-230	1,445-230	1,585-318
Stall Spd., flaps and gear down, mph.	70	71	82.5	80	84
Min. SE Control Spd., mph.	80	90	90	95	94
Rate of Climb, fpm.	1,300	1,450	1,270	1,300	1,410
SE Rate of Climb, fpm.	191	300	195	180	255
Svc. Clng., ft.	18,700	20,000	28,000	27,000	21,000
SE Svc. Clng., ft.	5,050	7,000	12,100	12,100	7,750
Take-off Distance, ft.	1,000	905	1,110	1,180	.....
Tot. Dist. over 50-ft. obst., ft.	1,280	1,260	1,450	1,560	1,980
Landing Distance, ft.	980	700	**1,000	*1,280	.....
Tot. Dist. over 50-ft. obst., ft.	1,590	1,455	**1,840	*1,685	1,850
Wing Area, sq. ft.	199.2	277.06	277.06	277.06	360.7
Wing Loading, lbs. sq. ft.	20.6	22.74	26.4	27.8	25.7
Power Loading, lbs. hp.	11.4	11.05	11.4	12.03	10.32
Span, ft.-ins.	37-10	45-3⅜	45-3⅜	45-10.5	49-8
Length, ft.-ins.	25-4	31-6.5	31-6.5	33-4	35-25
Height, ft.-ins.	9-6	11-4	11-4	14-2	9-8
Cabin Length, ins.	102	119	119	***108	***125
Cabin Width, ins.	42	54	54	54	52
Cabin Height, ins.	50	51	51	57	66
Cabin Door, ins.	36 x 37	36 x 37	36 x 37	HT. 51¾	45.5 x 26.7

NOTES: Performance is for gross weight at sea level unless noted. *Landing weight of 7,350 lbs. **Landing at 7,000 lbs. ***Passenger compartment length. Model B95 engines are Lycoming O-360-A1A. Model D50C engines are Lycoming G0-480-G2D6. Model H50 and Model 65 engines are supercharged and fuel-injected Lycoming IGSO-480-A1A6. Super G18 engines are Pratt & Whitney R-985. Model Super G18 performance is with 3-blade Hartzell propellers.

New Beech Debonair has 3-surface tail with swept vertical fin (above). Interior views and baggage compartment are shown below. It retains Bonanza structure and quality but lacks several Bonanza features and has 225-hp. derated Bonanza fuel-injected engine. —(Beech Photos.)

basic Bonanza quality in the Debonair, which features a swept vertical tail. With this article is a tabulation of factory data comparing the Debonair and the M35 Bonanza.

Both have the fuel-injected Continental IO-470 engine, but the Bonanza's 250-hp. "C" engine has higher compression and its cylinder heads have greater cooling fin area than the 225-hp. "J" engine in the Debonair. Both are rated at 2,600 rpm. and have 470-cu. in. displacement. The "C" uses 91/96 octane fuel, the "J" uses 80 octane. The Bonanza's controllable cowl flap, which provides precise control of operating temperatures and also reduces drag in cruising flight, has been omitted from the Debonair. Its cooling remains adequate, however. The Debonair has an 84-in. Hartzell constant-speed, controllable prop instead of the Bonanza's 82-in. Beech prop, 25-amp. instead of 50-amp. generator as on the Bonanza, 6.00 by 6 main gear tires on Cleveland wheels instead of 6.50 by 8 tires on Goodyear wheels, 1 landing light on the nose strut instead of two



GLIDAIR 17-A
Ice Repellent sprayed on landing gear and in wheel wells before takeoff on wet or slushy runways . . .

reduces ice adhesion during flight . . . helps keep gear free for safe landings!

GLIDAIR 17-A Ice Repellent applied to landing gear and in wheel wells helps prevent heavy adhesion of ice formed when moisture and slush picked up on takeoff freezes during flight. It sprays on quickly—no polishing necessary! And when sprayed on working parts, it also acts as a lubricant and offers protection against salt and chemicals.

GLIDAIR 17-A is already a popular favorite because it prevents icing on leading edges, antennae and struts, and helps maintain full prop efficiency. GLIDAIR 17-A polishes to a smooth, glossy silicone surface.

Keep several handy 16-oz. pressurized cans of GLIDAIR 17-A Ice Repellent in your plane. Available through most private operators, or write for the name of your nearest distributor.

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NEW FOR 1960

HEAVY-DUTY CESSNA 180 FOR FAST IN-AND-OUT DELIVERY

PILOT-PROVED BY PROFESSIONALS
"Rough terrain's no problem for this rugged bush plane. You can drop those big Para-Lift flaps and set down on a postage-stamp-size landing strip. Plenty of power for short take-offs, too—even with a full load!"—Orville Luttrell, Pilot, New Mexico

POWERED WITH 230 DEPENDABLE HORSES The new 4-place, *all-metal* Cessna 180 with a 6-cylinder, 230-h.p. Continental engine delivers your payload over a range of up to 675 miles at speeds up to 170 m.p.h. Climbs at 1,130 ft./min. to an above-the-weather 21,500-ft. service ceiling.

FOR PASSENGER OR CARGO Executive-styled interior makes it ideal for business flying. Seats can be removed in minutes for cargo! Carries a 1,120-lb. useful load. Extra convenience for easy loading: two yard-wide doors.

LANDS ON ROUGH FIELDS OR WATER—Standard spring-steel conventional landing gear with optional Goodyear castering wheels gives you safe, smooth rides over bumpy fields. Also available with floats, amphibious floats, or skis.

CESSNA'S HIGH-STABILITY WING is larger than average—175 sq. ft. area! Gives you greater lift and higher stability. Huge Para-Lift flaps give you a full range of lift or drag for short-field operations.

LEVELAIR AUTOMATIC FLIGHT—developed for Cessna by *Tactair*—makes flying as easy as dialing your radio! Available as optional equipment.

PLUS MANY MORE BIG CESSNA FEATURES at just $14,675 with std. equip., f.a.f. Wichita.

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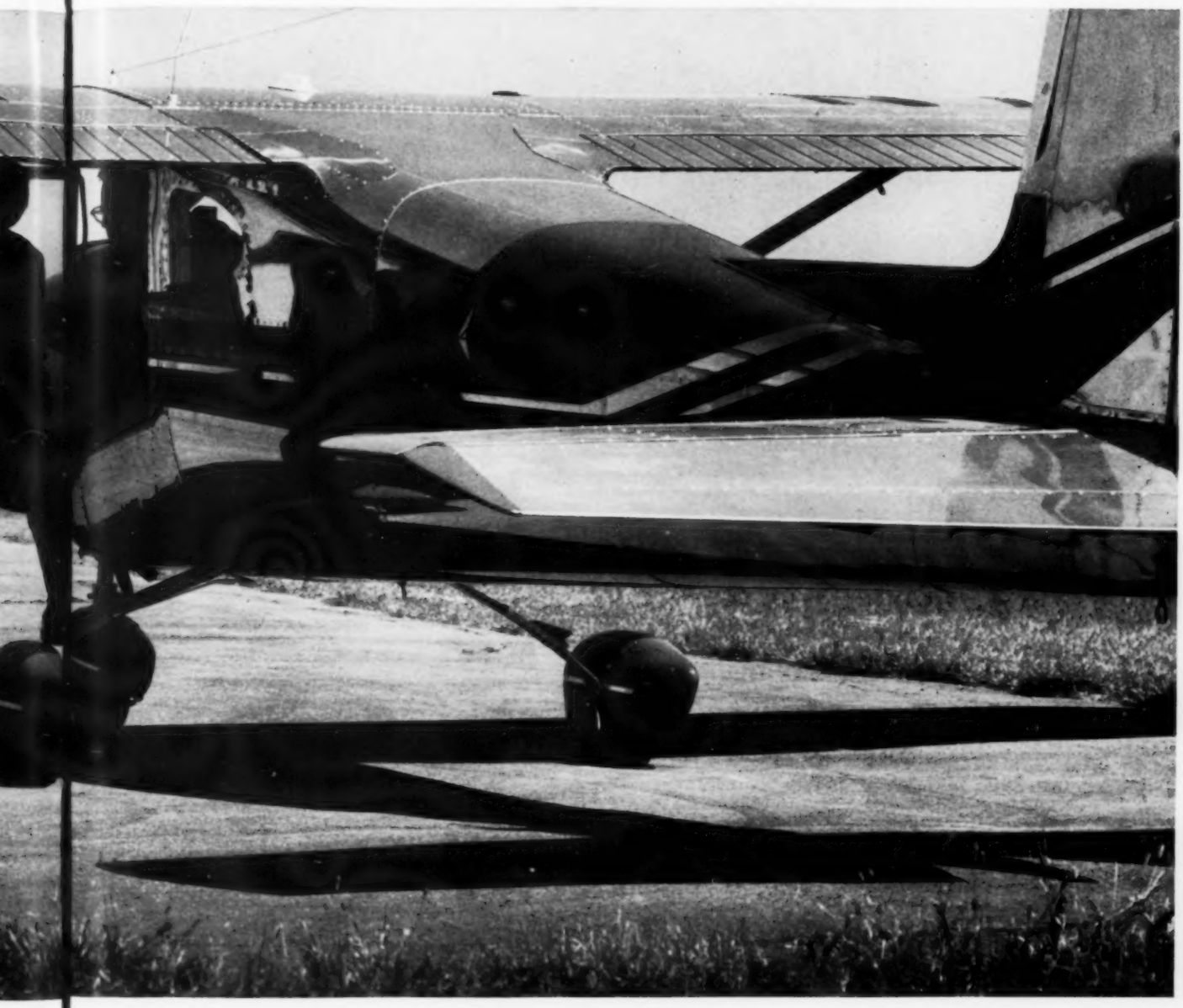

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Clinton Aviation Company
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Denver, Colorado

Cruse Aviation, Inc.
International Airport
Houston, Texas

Dal-Tex Aviation, Inc.
Addison Airport
Addison, Texas (Dallas)

Executive Aircaft Company
701 Perimeter Road
Kansas City, Missouri

Poelman Aircraft Co.
New Orleans Airport
New Orleans, Louisiana

Ragsdale Flying Service
Municipal Airport
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Skyways
Hastings and Grand Island
In Central Nebraska

Southwestern Skyways, Inc.
Municipal Airport
Santa Fe, New Mexico
and Ogden, Utah

Kenneth Starnes Aviation Service
Adams Field
Little Rock, Arkansas

Sunny South Aircraft Service, Inc.
Broward International Airport
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Walston Aviation, Inc.
Civic Memorial Airport
East Alton, Illinois

Wings, Inc.
Wings Field
Philadelphia 18, Pa.

Yingling Aircraft, Inc.
Municipal Airport
Wichita, Kansas

wing landing lights and 4 side windows instead of 6 as on the Bonanza.

It seems importance of the larger tires and the two wing landing lights would have warranted their retention on the Debonair, but these and other changes are dictated by the need for holding the price down to $19,995. Here are some other standard Bonanza items which the Debonair does not have — battery relay, turn and bank, clock, outside air temp, sensitive altimeter, cylinder head temp, aileron trim control, openable rear windows, individual rear seat backs, complete exterior paint finish and retractable step. All these add up to real money and make the Bonanza the Cadillac of the air — they had to go as a concession for the lower Debonair price.

Structurally, the Debonair and Bonanza are the same. The Debonair's 3-surface tail weighs 14 lbs. more than the V tail. It is debatable whether the vertical tail gives a smoother ride than the V tail and hangar-flying arguments doubtless will persist for and against both configurations. Stall speed is listed at 59 mph. for the M35 and 60 for the Debonair but is probably the same, this 1-mph. difference probably being due to instrument calibration in the certification process — wing loading of 16.3 lbs. per sq. ft. is the same for both airplanes.

While not as plush as the M35 Bonanza, the Debonair is still a quality airplane featuring top-notch standards and craftsmanship and its interior finishing is impressive even if it does not duplicate the Bonanza's decorative appeal. Beech obviously avoided the "station wagon" approach to economy in the cabin. Its instrument panel is shorn of the Bonanza's piano-hinge switches and controls but the Debonair's switches and controls are just as functional and dependable without all the fancy frills.

For the $5,305 difference in price, there are people who will prefer the Debonair to the Bonanza, adding extras according to their own desires. The Debonair's price makes it more competitive than the Bonanza to the Cessna 182 and 210 and the Piper Comanche and this is the target at

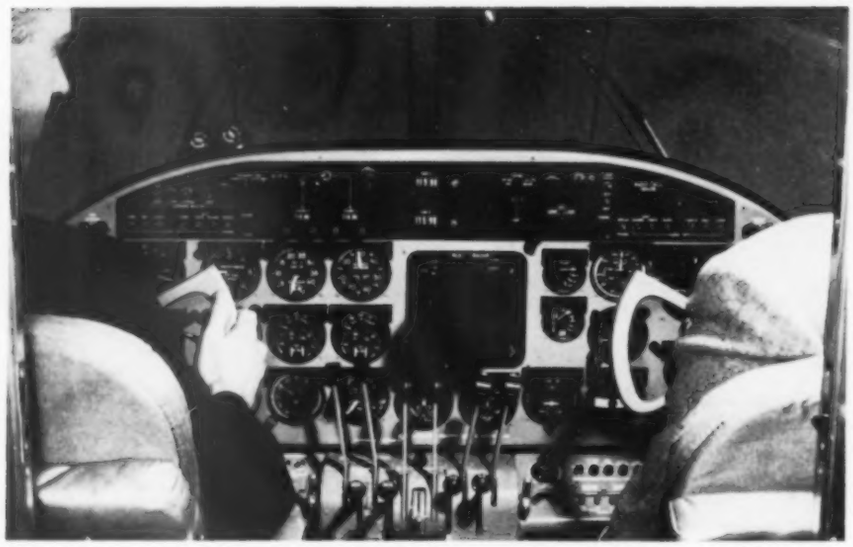
Beech M35 Bonanza and Model 33 Debonair

Factory Data

	Model M35 Bonanza	Model 33 Debonair
Price	$25,300	$19,995
Engine (Cont'l. Fuel Inj.) Model	IO-470-C	IO-470-J
Hp.-rpm.	250-2,600	225-2,600
Gr. Wt., lbs.	2,950	2,900
Empty Wt., lbs.	1,832	1,730
Useful Ld., lbs.	1,118	1,170
Fuel Cap., Gals.	49	49
Opt. Fuel Cap., gals.	68	68
Oil Cap., qts.	10	10
Top Spd., mph.	210	195
Cruise Performance—		
75% hp., mph.-alt. ft.	200-7,000	185-7,000
65% hp., mph.-alt. ft.	195-10,000	180-11,000
55% hp., mph.-alt. ft.	180-10,000	—
45% hp., mph.-alt. ft.	—	143-10,000
Cruising Range—		
55% hp. @ 10,000 ft., mi.-gals.	910-49;1,245-68	—
45% hp. @ 10,000 ft., mi.-gals.	—	845-49;1,170-68
Stall Spd., landing with flaps, mph.	59	60
Rate of Climb, fpm.	1,170	1,010
Svc. Clng., ft.	20,000	19,800
TO Run, flaps & 10-mph. wind, ft.	670	690
Landing Run, flaps & 10-mph. wind, ft.	400	420
Bag. Cap., lbs.	270	270
Span, ft.-ins.	33-5.5	32-10
Length, ft.-ins.	25-2	25-6
Height, ft.-ins.	6-6.5	8-3
Wing Area, sq. ft.	181	177.6
Wing Loading, lbs. sq. ft.	16.3	16.3
Pow. Loading, lbs. hp.	11.8	12.9

NOTE: Performance is for gross weight at sea level unless noted.

New squared wing tips distinguish new M35 Bonanza. —(Beech Photo.)



New Beech Super G18 cockpit's revised instrument panel, 2-piece windshield and enlarged side windows are shown above. Note new glare shield and radio panel, new storm window. —(Beech Photos.)

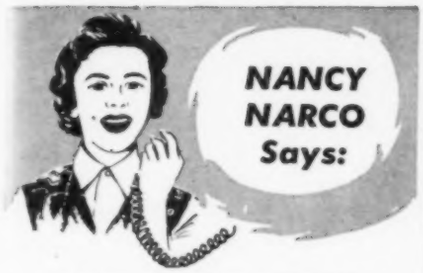
which Beech has aimed the Debonair.

M35 Bonanza

New squared wing tips of the Hoerner type have been added to the M35 Bonanza for more aerodynamic efficiency and interior styling incorporates new upholstering and furnishings while a new exterior paint design gives it a new appearance. Beech went from the 1959 "K" to the "M" series, skipping the "L" to avoid possible confusion with military designations.

While Beech lists 200-mph. cruise at 7,000 ft. on 75% hp., 195-mph. at 10,000 ft. on 65% hp. and 180 mph. at 10,000 ft. on 55% hp. for the M35, a dealer's trip home in one of the new Bonanzas after the annual sales meeting illustrates the M35's outstanding performance capabilities. Chuck Amos of Aero Sales & Service at Fresno, California, reported he flew Bonanza N-5851K 1,275 miles nonstop from Wichita to Inyokern in 6 hrs. 20 mins., cruising at 12,500 ft., where his true air speed was 198-204 mph. using 2,300 rpm. and 18 ins. of manifold pressure for 53% hp. His fuel consumption was 9.5 gals. per hr. His block-to-block speed was 201 mph. With auxiliary fuel supply, the M35

Here's new rear-door Twin-Bonanza cabin, looking aft over aisle between pilot and co-pilot chairs.
—(Beech Photo.)



CAN'T GET THE TOWER?

Things get a little sticky, both for you and the tower, if you can't make contact after the first two or three tries. You're probably rapidly nearing the pattern without clearance, or you're milling around 10 miles out, cussing the tower and your radio. The tower man (poor guy, it's illegal for him to cuss) probably hears you loud and clear and is using up a lot of air time giving you the long count. There are several good reasons why people have trouble receiving the tower:

1. WRONG NUMBER. Tower frequencies *do* change and these changes don't show up on old WAC or Sectional charts. If you're doing any extensive cross-country flying, radio facility charts (Jepp or Coast and Geodetic) are pretty much a must.

2. IMPROPER TUNING. If your receiver is a tunable one without benefit of "whistle stop" or crystal-controlled tuning, allow for discrepancies in your tuning dial. When you call a tower, have your hand on the tuning crank and rock it back and forth, bracketing the approximate position on the dial where you should be getting the tower. This is especially true if you're in a strange airplane with a receiver you're not familiar with. Some of them can get five-tenths of a megacycle off calibration. So don't just rock the needle back and forth one or two tenths to each side of where you think the tower should be. "Scan" a good area.

3. KILTER FACTOR. Maybe you've done things right, but things in the cockpit are out-of-kilter. You've forgotten to turn your volume up or the audio switch on. Perhaps you've inadvertently hit the tuning knob and knocked it off frequency. Or maybe you haven't switched your transmitter to tower frequency!

Probably the best advice is "sooner tuning." Start tuning 20 to 30 miles out, and make your first transmission at least 10 miles out. Even before that, figure out the tower frequency, be "mentally prepared." If there's some question on the numbers, you can always call the nearest FAA station and they can give you the proper frequency.

And, speaking of "numbers," you can save the tower a lot of repetition by following a procedure which is just coming into usage. If you already have the tower tuned before your first call-up and hear the tower giving other airplanes runway number, wind, altimeter, etc., just tell the man after he acknowledges your first transmission, "I have your numbers." That means you have all the pertinent landing information, no need for him to go through the same song and dance.

Regards,

Nancy

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NEWEST, FASTEST, LARGEST AIRCRAFT TO JOIN THE PIPER BUSINESS FLEET

Business aviation takes a giant step forward with the great new Piper Aztec. Here's an over 200 mile-an-hour executive twin that sets new standards in all-around performance and job capability and new standards in price and economy for fast, convenient, personal air travel.

With two 250 horsepower direct-drive Lycoming engines, famed for their ruggedness, simplicity and reliability, the Aztec carries a *useful load of over one ton*, takes off shorter, lands shorter and has a higher single-engine ceiling than any twin in the same class carrying a similar payload!

HIGHEST SINGLE ENGINE CEILING!

The Aztec on one engine will climb to and fly at a higher altitude than any other airplane in its class carrying a similar payload.

PIPER AZTEC

AZTEC CALENDAR

When you travel by Aztec your calendar will be as unusual as this ancient Aztec calendar stone. For your calendar will show many extra days per month—whole days saved, whole days gained thanks to the swiftness of Aztec flight. *(Aztec calendar design from Indian Art of the Americas by L. H. Appleton, © 1950, Charles Scribner's Sons.)*

The Aztec's amazing load carrying ability means you can carry full 144 gallons of fuel, five 170-pound passengers, full radio and IFR instrumentation plus baggage! And you cruise a good solid 205 mph at 7000' (75% power) with over five hours of fuel—over eight hours duration at economy cruise.

And, as can be expected, Piper efficiency has produced a practical price for the Aztec—$49,500, all the more remarkable because this price includes full equipment... five passenger cabin arrangement, dual generators, dual vacuum and hydraulic systems, 144 gallons of fuel, full instrumentation, rotating beacon, heated pitot... *complete!*...everything but the customer's choice of radio.

This newest, fastest, largest airplane to join Piper's business fleet will change your concept of what your aircraft investment will return in the way of performance, comfort, utility and economy. A demonstration will be gladly arranged through your Piper dealer —or write on your business letterhead for an Aztec catalogue, Dept. F-12.

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UNion 3-3621 *UNion* 3-5394
Gallup, New Mexico

BROWNING AERIAL SERVICE
Municipal Airport
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HOmstead 5-1728
Austin, Texas

CUMMINGS & GROVES AVIATION, INC.
Houston International Airport, Hangar No. 8
MIssion 4-5593 *and OLive* 4-4351
Houston, Texas

DELAWARE AVIATION CORPORATION
North Philadelphia Airport
HObart 4-1600, *TWX PH* 520
Philadelphia 36, Pennsylvania

DES MOINES FLYING SERVICE, INC.
Howard Gregory, President
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ATlantic 8-2218
Des Moines, Iowa

EXECUTIVE AIRMOTIVE, INCORPORATED
Stewart Air Park
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Parkersburg, West Virginia

J & J AIRCRAFT, INC.
Sarasota-Bradenton Airport
821 *General Arnold Road*
ELgin 5-6868
Sarasota, Florida

KEN-MAR AIRPARK, INC.
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Box 2667, *University Station*
MUrray 3-6589
Wichita, Kansas

PIEDMONT AVIATION, INC.
Smith Reynolds Airport
PArk 5-0511
Winston-Salem, North Carolina

RED AIRCRAFT SERVICE, INC.
Broward County International Airport, Building 78
JAckson 3-9624
Fort Lauderdale, Florida

ROSS AVIATION, INC.
Riverside Airport
HIckory 6-6654
Tulsa, Oklahoma

ST. LOUIS FLYING SERVICE
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St. Louis, Missouri

has 68-gal. fuel capacity.

B95 Travel Air

The Travel Air, smallest of the Beech twins, has been given numerous improvements for 1960. Its cabin interior has been extended 19 inches farther rearward for an interior cabin length of 102 inches, providing 147 cu. ft. of space for people and baggage, an increase of 17 cu. ft. This expansion adds greater leg room and more comfort in individual, fully-reclining, track-mounted chairs. With the fifth chair and the chair behind the pilot fully reclined, a couch is easily improvised. For better visibility, the front seat has been raised.

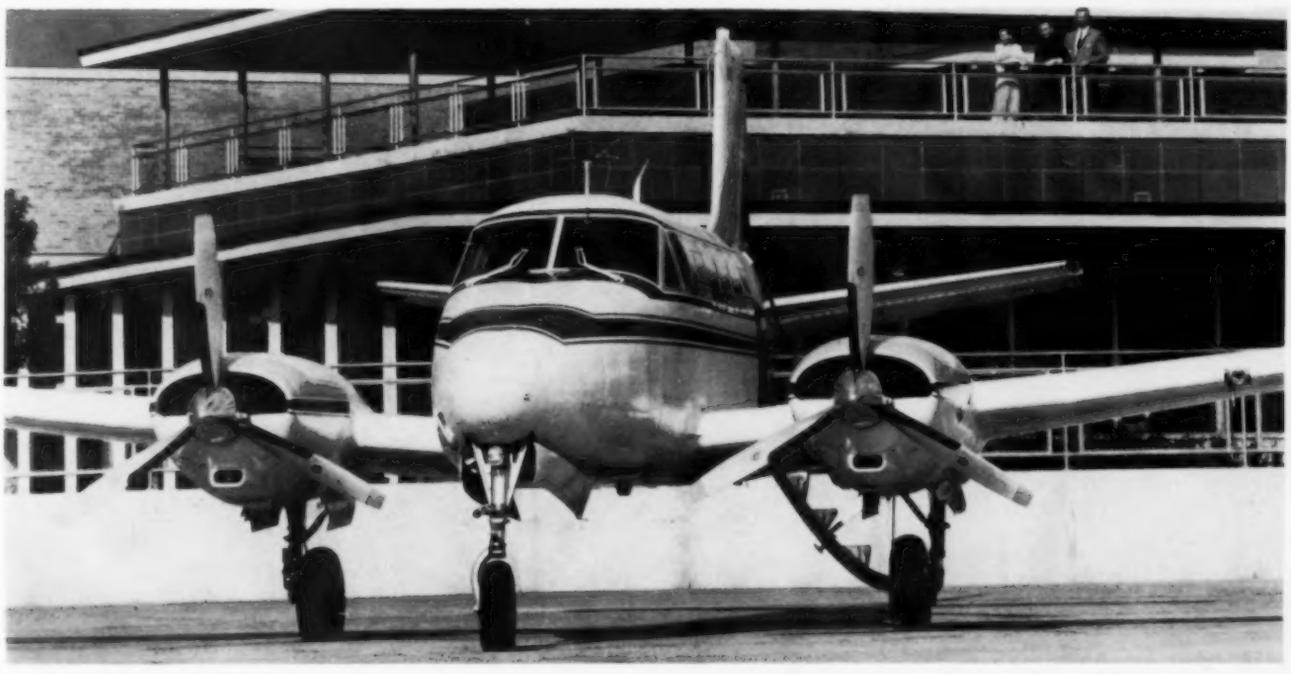
A new vertical fin gives the Travel Air a new look and the horizontal stabilizer and elevator surfaces have been made larger for improved load distribution and flight characteristics. The flap is extended farther rearward. Gross weight has been upped 100 lbs. to 4,100 lbs., at which useful load is 1,465 lbs. With two 180-hp. Lycoming engines, the Travel Air cruises 200 mph. on 75% hp. at 7,500 ft., and its 112-gal. fuel supply, including auxiliary tanks, provides up to 1,410 miles of range. Full details are listed in the accompanying tabulation of data for all Beech twins.

Beech Queen Air cockpit's spaciousness is noted in this view of instrument panel with radar scope at center. —(Beech Photo.)

D50C and H50 Twin-Bonanzas

A major improvement has been accomplished in the Twin-Bonanza by redesigning the cabin to incorporate a rear stair door. This eliminates the Bonanza-type door atop the wing and thereby eliminates the wing-climbing demands on passengers. It also makes possible the use of individual seats and an aisle for maximum cabin seating flexibility and comfort, with the pilot entering last and securing the door or leaving first and opening the door, or entering or leaving at will without disturbing the passengers. This standard of cabin flexibility and comfort is expected in airplanes of the Twin-Bonanza category — without such a cabin design, earlier Twin-Bonanzas were burdened with a built-in handicap penalizing this fine airplane's maximum utilization and sales potential.

Here's new front view of Beech Queen Air. —(Beech Photo.)



The new configuration should greatly stimulate Twin-Bonanza sales and gain for Beech a larger share of the market for twins in the $80,000-$100,000 bracket.

Both the D50C, powered by two 295-hp. Lycomings and boasting a 2,200-lb. useful load at a 6,300-lb. gross weight, and the H50, powered by two 340-hp. supercharged and fuel-injected Lycomings with a 2,820-lb. useful load at a 7,300-lb. useful load, feature a lower cabin floor for increased headroom, individual, track-mounted reclining chairs, work table, new pilot chair with vertical adjustment, flush-type fuel vents to eliminate vent icing, and new squared wing tips for more aerodynamic efficiency. The heater system now has dual fuel pumps for more effective thermostatically-controlled warm air output.

The $95,500 H50 cruises 213 mph. on 70% power at 10,000 ft. and has 230-gal. fuel supply, including auxiliary tanks, for a range up to 1,600 miles, while the $83,000 D50C cruises 203 mph. on 70% power at 7,000 ft. and has up to 1,650 miles of range on 180 gals. of fuel, including auxiliary tanks. Other details are contained in the accompanying tabulation.

Model 65 Queen Air

The newest of all Beechcrafts is the Queen Air, which was announced and fully described in last month's FLIGHT MAGAZINE. Scaled up from the Twin-

(Continued on page 73)

Beech Queen Air interior views above show cabin appointments including large windows with pull-down shades and aft-cabin galley, bulkhead, baggage shelves and toilet. Part of busy production line below shows Travel Airs, Debonairs and Bonanzas in final assembly stages.

—(Beech Photos.)

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Crystal City—Crystal City Airport
Cuero—Cuero Municipal Airport
Eagle Pass—Eagle Pass Municipal Airport
El Campo—Hefner Airport
Falfurrias—Brooks County Airport
Garwood—Garwood Airport
La Grange—Guenther Airport
Port Lavaca—Tanner's Airport & Seaplane Base
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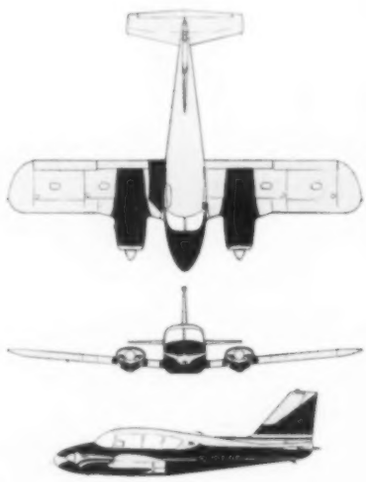
Swept tail and rear cabin windows distinguish new 5-place Piper Aztec from the popular but less-powerful Apache. Aztec weighs 1,000 lbs. more, has two 250-hp. Lycomings and 200-mph. cruise with fuel for 6 hours at 200 mph. Three versions are priced from $49,500 to $54,105. —(Piper Photo by Anthony Linck.)

Piper's New Aztec Twin

A NEW light twin which is destined to take over a considerable share of the ever-growing market for business twins is the new high-performance 5-place Aztec, which Piper Aircraft Corp. began delivering this month for the first time.

Powered by two 250-hp. Lycoming engines, the Aztec has a top speed of 215 mph., a 200-mph. cruising speed using 65% hp. at 9,000 ft., and a 144-gal. fuel supply for a no-reserve range of 1,200 miles at 200 mph.

These and other factory figures make the Aztec a remarkable competitor on the business twin market. The standard version of the Aztec, for example, is priced at $49,500, which is considerably less than the price for any twin in its 500-hp. category. At a 4,800-lb. gross weight, it has a useful load of 2,025 lbs. This is 42.18% of its gross weight and is remarkable in itself when compared to other light twins whose useful percentage of gross weight is down around 35-38%. From a dollar standpoint in price alone, the Aztec's remarkable value figures out to be $24.40 per lb. of useful load or $99 per hp., as compared to other light twins in or near its category which range from $30.11 to $35.08 per lb. of useful load and from $109.-50 to $170 per hp. These market facts distinguish the new Aztec as a comparative bargain and Piper can be expected to set all-time sales records for light twins with it.



Three-view sketch shows Aztec's access doors to four fuel tanks outboard of engines and tail's single-piece stabilator with long, narrow anti-servo trim tab. Replacing conventional elevator, stabilator provides improved control at low speeds. Aztec has 37-ft. span, 27.6-ft. length and 10.3-ft. height. —(Piper Sketch.)

Factory performance figures in addition to speed are just as impressive as market factors for the Aztec. It has a 1,650-fpm. rate of climb, a 365-fpm. single-engine rate of climb, a 22,500-ft. service ceiling, a 7,400-ft. single-engine service ceiling, and will take-off or land over a 50-ft. obstacle in less than 1,400 ft. An accompanying tabulation compares the Aztec with its stablemate, the Piper Apache, to point up all of the Aztec superiorities. These place the Aztec in a new and separate category above the Apache in power, performance and price.

Developed from the popular Apache, the Aztec has a completely new tail assembly incorporating a swept rudder and a single-piece "flying tail" stabilator. The latter provides improved elevator control at low speeds and has an anti-servo tab running nearly the full span of its trailing edge to aerodynamically minimize pitch changes caused by passengers moving their weight about in the long cabin, and to resist excessive speed build-up in a nose-down attitude. A servo tab on the swept rudder reduces rudder pressure needed with one engine out by providing aerodynamic boost when rudder pressures are applied.

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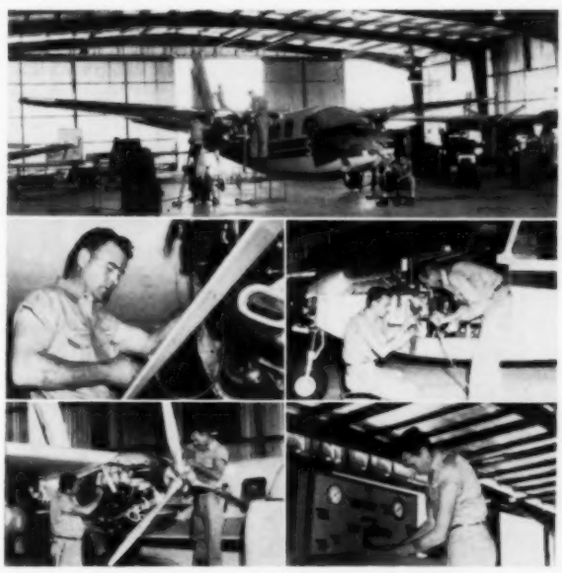

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Piper Aztec and Apache

Factory Data

	1960 Aztec	1959 Apache
Price, Standard Model	$49,500	$36,990
Horsepower	500	320
Gr. Wt., lbs.	4,800	3,800
Empty Wt., lbs.	2,775	2,230
Useful Load, lbs.	2,025	1,570
Useful Pct. of Gr. Wt., %	42.18	41.32
Std. Fuel Cap., gals.	144	72
Top Spd., mph.	215	183
Cruising Performance—		
75% hp., mph.-alt. ft.	205-7,000	171-6,000
65% hp., mph.-alt. ft.	200-9,000	163-9,000
Fuel Cons., 75% hp., gph.	28	18.8
Fuel Cons., 65% hp., gph.	24	16.3
Range, max. at 75% hp., mi.-gals.	1,025-144	940-108
Range, max. at 65% hp., mi.-gals.	1,200-144	1,070-108
Range, max. at 45% hp., mi-gals.	1,400-144	1,260-108
Stall Spd., mph.	62	56
Rate of Climb, fpm.	1,650	1,050
SE Rate of Climb, fpm.	365	180
Service Clng., ft.	22,500	17,000
SE Service Clng., ft.	7,400	5,500
Take-off Run, ft.	750	1,190
Tot. Dist. over 50-ft. obst., ft.	1,100	—
Landing Roll, ft.	900	750
Tot. Dist. over 50-ft. obst., ft.	1,360	—
Wing Area, sq. ft.	207	207.5
Wing Loading, lbs. sq. ft.	23.5	18.6
Power Loading, lbs. hp.	9.6	11.9
Span, ft.	37	27.25
Length, ft.	27.6	27.1
Height, ft.	10.3	9.5
Bag. Cap., lbs.	200	200
Bag. Compt. Volume, cu. ft.	25	25

NOTE: All performance is for gross weight at sea level unless noted.

Rear windows also distinguish the Aztec from the Apache.

Three versions of the Aztec are offered. At $49,500, the Standard Aztec has 144-gal. fuel capacity, dual 50-amp. generators, dual vacuum pumps, rotating beacon, heated pitot tube, gyro instruments and fifth seat. At $53,355, the Super Custom Aztec adds a Lear ADF-12-E, Narco Omnigator Mark II (omni navigation, ILS localizer, marker beacon, 27-channel transmitter and tunable VHF receiver), a Narco Mark V (90-channel transmitter and 190-channel crystal-controlled receiver), and a Narco CS-3A VOR-ILS indicator. At $54,105, the AutoFlite Aztec adds Piper's 4-lb. all-transistorized AutoControl automatic flight system.

The Aztec has 5 individual seats, the two forward and two center seats reclinable to 3 positions and having headrests as standard equipment. All five seats can be individually adjusted fore and aft for leg room and are quickly removable for cargo. Seats are leather upholstered with contoured backs, with cabin sidewalls finished in leather and washable nylon and with wall-to-wall carpeting over a rubber mat. Soundproofing includes double-thick windows and quarter-inch windshield. Each seat has airline-type cooling air outlet and ashtray. A 27,500-BTU Southwind heater in the nose can be turned on before take-off for ground heating.

Four 36-gal. rubber cells carry the Aztec's 144-gal. fuel supply in the wings outboard of the engines. A cross-feed system enables either engine to use fuel from any of the four tanks, and either outboard or inboard tanks can be used for all take-off, flight or landing operations. Two engine-driven fuel pumps are supplemented by four electrically-driven boost pumps used on take-off and landing. A console between the two front seats groups fuel selector valves, primers, cross-feed and cabin heater fuel supply controls.

Apache-proved systems were adapted for the Aztec. Landing gear was beefed up for the Aztec's 1,000-lb. weight increase over the Apache but the hydraulic retraction system, with supplementary CO-2 emergency extension system, is the same, as are

Aztec features five individual seats with headrests as standard equipment. All but fifth seat are reclinable. Contoured seats are leather-upholstered. —(Piper Photo by Anthony Linck.)

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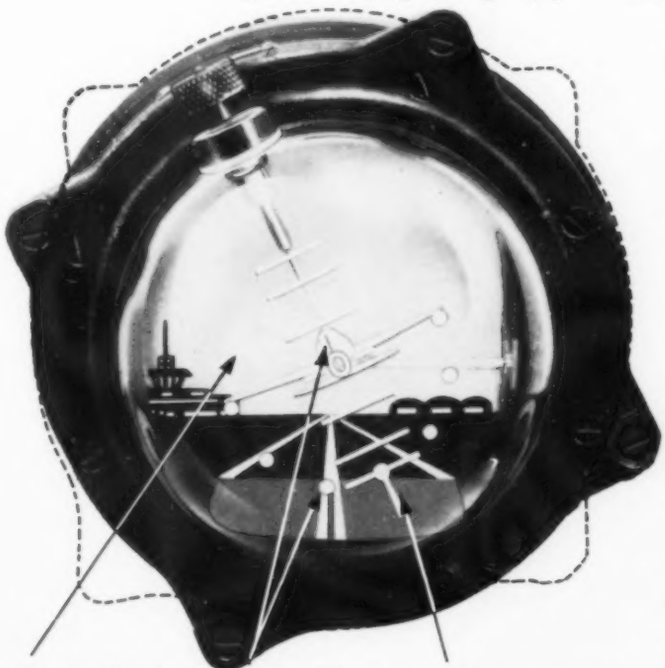

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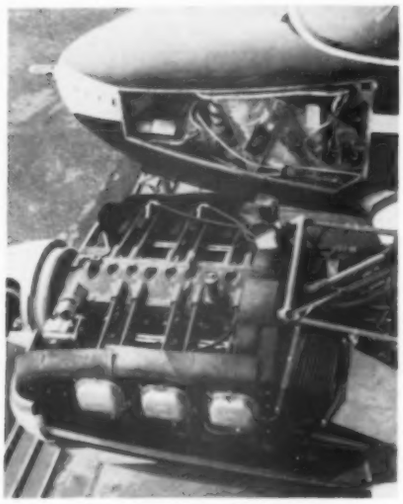

Removable panels provide easy access to 250-hp. Lycoming engines and nose equipment section of the Aztec. Underwing exhaust augmentors are outboard of each engine and lined with noise absorption material for cabin quietness. —(Piper Photo by Anthony Linck.)

the hydraulic flap, electric and vacuum systems. New improved nose cowl sections have relatively small air intakes slightly below the cylinders for maximum cooling in climb but minimum drag in cruise. Exhaust augmentor tubes are lined with fiberglass for sound deadening and are located outboard of the nacelles under the wing. A carburetor heat temperature gauge is standard and carburetor heat rise is 200 degs. Two 250-watt landing lights are standard, one fixed on the nose and the other mounted on the nose gear strut and differentially linked so that when the nose wheel is turned, the light turns at a greater angle to light the taxiing area.

In anticipation of a heavy demand for Aztecs, Piper has instituted a heavy production schedule which jumped from 2 in November to 20 in December and will reach 30 per month in January. The Aztec will then be integrated with Apache production for a total of 2 twins per day for 40 per month. This is the heaviest production schedule ever undertaken for twins in the business aircraft industry.

Piper describes 1959 as its most successful year, with sales up 26% over 1958 as new airplane deliveries boomed upward to $44,032,000 in retail value. J. W. Miller, sales manager, said he expects this volume to soar past the $60,000,000 mark during 1960 for an increase of 40% over 1959. Piper has set its sights on a goal of $119,000,000 for the year of 1965 and says it hopes by then to have captured 45% of the world market.

The company has launched an intensive six-year drive for sales expansion and its research and development program is working on significant new advancements for its aircraft. Included is a low-wing replacement for the Tri-Pacer, and Piper has expressed its interest in providing the market with a modern new low-priced two-place airplane of low-wing, tricycle-gear design. For sales intensification, it has presented its dealer organization with a "revolutionary" new 65-page sales manual which includes impressive facts and figures covering all forms of business transportation. In addition, the company is organizing a "sales personnel selection" program for its dealers, directed by Dr. John Bone, Ph. D. of Lock Haven Teachers College, and will also analyze distributor territories for factory assistance locally.

Aztec's new paper-pleat disposable air-filter provides 99.5% dust removal efficiency for engine protection against dirt and abrasives. —(Piper Photo by Anthony Linck.)

Here's efficient and completely-equipped instrument panel of AutoFlite version of the Aztec, showing Narco communications and navigation equipment with Lear ADF and gyro instrumentation. Note turn displayed on gyro, with transistorized Piper AutoControl providing hands-off automatic turns or heading lock. —(Piper Photo by Anthony Linck.)

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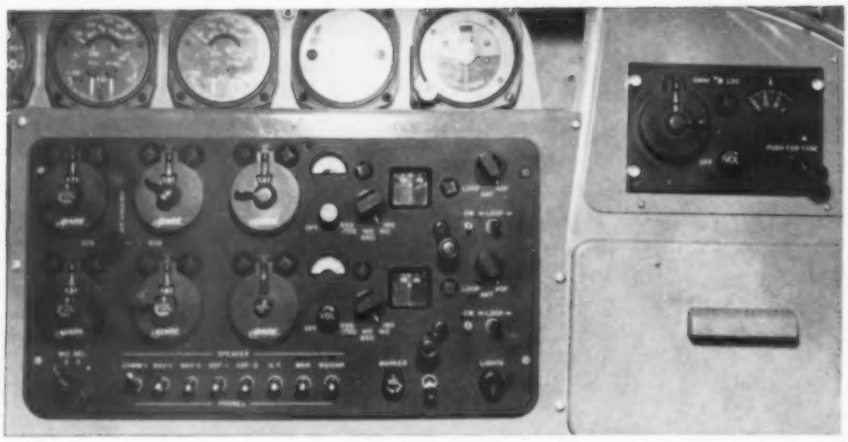

Dare's new nav-com system controls and instrumentation are pictured above in the radio firm's Twin-Bonanza. Large panel has dual DADF-1's, dual DN-560 omni-localizer receivers, a DTR-360B VHF transceiver, DGS-20 glideslope and DM-3 marker receiver, plus an HF control head and an experimental control head. Pre-set dual switching is provided. Panel above glove door is Dare 90-CR standby transceiver. Instrumentation includes new Dare ADF rotatable azimuth for dual ADF's and dual DNI-2 navigation indicators.

New Dare Nav-Com System

A NEW lightweight navigation-communication system meeting newest standards has been completed by Dare, Inc., Troy, Ohio, is in production and is now available from Dare dealers throughout the country. Included are a new 560-channel crystal-controlled omni system, newly-improved 360-channel VHF transceiver featuring 20-watt transmitter, Dare's outstanding ADF, 90-channel standby transceiver, glideslope-marker beacon receivers and 10-watt speaker amplifier. New and improved control heads and indicators go with it. The complete system, including two omni receivers and one each of the other units listed above,

(Continued on page 74)

New airline-type Dare nav-com system components are pictured below being examined by Carl Fox (center) of Associated Radio at Love Field in Dallas, with Elliot Polansky (left) and Roger Burdorf of Dare. After an evaluation, Fox said the new 115-lb., $14,000 system provides higher standards than ever for top performance and dependability.
—(FLIGHT MAGAZINE Photo.)

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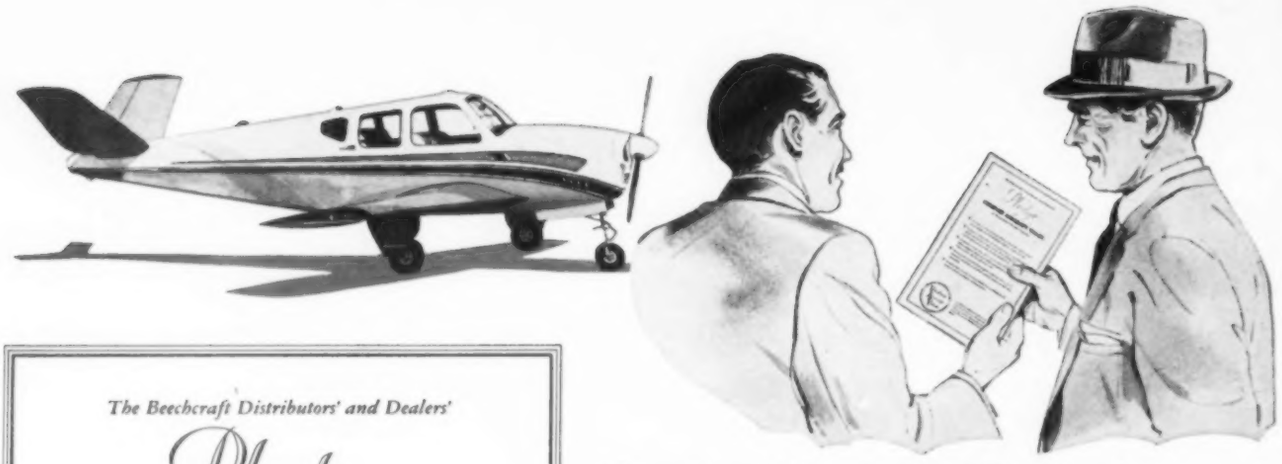

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BEECH ADVANCEMENTS

(Continued from page 62)

Bonanza, this is a Beech design classic destined to be the leader of the Beech fleet. It emphasizes cabin bigness and spaciousness with considerable "stretchability" for possible future developments.

At present, 340-hp. fuel-injected and supercharged Lycomings are the limiting factor in power availability. Even so, the Queen Air at 7,700-lb. gross weight has a power loading of 12.03 lbs. per hp., with which cruising speeds are 205 mph. on 70% hp. at 10,000 ft. and 200 mph. on 65% hp. at 10,000 ft. Useful load is a hefty 2,960 lbs.

But the big cabin is the Queen Air's major virtue. Resembling a miniature Convair, with integral rear stair door, the Queen has a roomy cockpit sealed off by a bulkhead from a 108-in. long passenger compartment in which two pairs of facing seats, with a table, are the standard arrangement. Behind are a refreshment galley, a bulkhead, a versatile baggage area and a toilet. Alternate 7-place seating is available. Details are contained in the accompanying tabulation, in which it will be noted that stall speed with gear and flaps down is 80 mph. and minimum single-engine control speed is 95 mph. These figures supersede those given in last month's FLIGHT MAGAZINE, in which factory data listed stall speed with gear and flaps down at 84.5 mph. and minimum single-engine control speed as 94 mph.

Model Super G18

A new and roomier cockpit has been provided in the Super 18, the 1960 version being designated as the G18, and it has a gross weight of 9,700 lbs. when equipped with 3-blade Hartzell propellers, with a useful load of 3,750 lbs. — highest in the Model 18's history. Either Hartzell or Hamilton Standard props are standard, but gross weight with the latter is 9,300 lbs.

The new cockpit features a 2-piece glass windshield with increased slant angle to diffuse rain more effectively, new lightweight and adjustable pilot chairs, more head room, reduced control column travel, adjustable rudder pedals, new and larger side windows with new type of storm window, and new one-piece glare shield.

The $126,000 G18 has 900-hp. Pratt & Whitney engines and cruises 214 mph. on 66.7% of power (300 hp. per engine) at 10,000 ft. and 202 mph. on 55.7% hp. at 10,000 ft. Fuel capacity of 318 gals. provides range up to 1,585 miles. Seven to nine-place seating is available in a variety of arrangements.

Aerojet standby rocket power is approved on both Twin-Bonanza models, the Queen Air and the Super G18. Junior Jato rockets, one installed atop the wing in each nacelle afterbody, provide instantaneous auxiliary thrust for emergency use.

Beech Travel Air cabin is pictured here looking forward from rear cabin bulkhead (left), with aisle between two rear seats for entry to fifth seat behind them. New Travel Air has new instrument panel in addition to added cabin length and new fully-reclining individual chairs. The Travel Air cabin interior has been made more luxurious than ever. Its two front seats have been raised higher to offer improved visibility.
—(Beech Photo.)

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DARE NAV-COM SYSTEM

(Continued from page 70)

costs $14,602.62, weighs 115.6 lbs. including all indicators, control heads, shockmounts and connectors but less wiring and installation, and the 28-volt system has a current drain of 16.9 amps.

Elliot Polansky, sales manager of Dare, has been demonstrating the new equipment in the Dare Twin-Bonanza, and Dare dealers have been evaluating the new gear, all of which meets or exceeds TSO and other new requirements. Here is a run-down on the 13.75 and 27.5 volt Dare system's units:

DARE DN-560 — A complete VHF omni-localizer navigation-communication system providing crystal control, 560 channels with 50-kc spacing and covering 108.00-135.95 mc range. Its transistorized power supply is self-contained in the receiver unit and its DNC-4 navigation converter is the industry's most compact and lightest. This omni meets new ARINC specifications with excellent accuracy and several unique features including (1) a squelch system, which can be remotely controlled, for use in the omni bands as well as communications without interference with instrumentation; (2) a built-in thermal overload system to protect the equipment and which resets itself; (3) a crystal band-pass filter for better selectivity; (4) simplified circuits which retain top performance and eliminate unnecessary complications; (5) optional front or rear plug antenna connections, and (6) automatic glide-slope switching. Complete DN-560 omni system weighs only 21.25 lbs., and is priced at $3,175. Receiver fits

(Continued on page 81)

Carl Fox of Associated Radio is shown examining navigation module of new Dare equipment, with Roger Burdorf and Elliot Polansky of Dare.

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Love Field, Dallas, Texas

GREENSBORO-HIGH POINT AIR SERVICE, INC.
Greensboro-High Point Airport
Greensboro, North Carolina

ELLIOTT FLYING SERVICE
- Municipal Airport, Des Moines, Iowa
- Municipal Airport, Davenport, Iowa

THE NORMAN LARSON CO.
PLANESERVICE, INC. (Service Division)
Van Nuys Airport, Van Nuys, Calif.
(Los Angeles Area)

ROSCOE TURNER AERONAUTICAL CORP.
Municipal Airport, Indianapolis, Ind

TEXAS AVIATION CORPORATION
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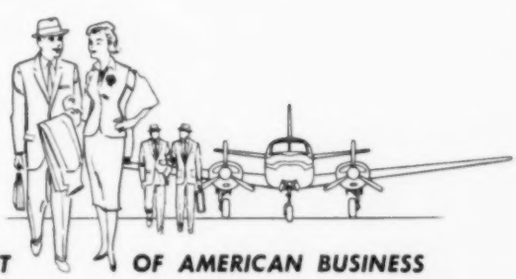

BEECHCRAFTS ARE THE AIR FLEET OF AMERICAN BUSINESS

New Business in the Hangar

BUTLER AVIATION has acquired Skymotive, Inc., large service center at O'Hare Airport in Chicago, and has opened a new facility at Florida's Palm Beach International Airport. These are the 9th and 10th Butler facilities, others being at LaGuardia Airport, Washington National Airport, Meigs Field in Chicago, Midway in Chicago, General Mitchell Field in Milwaukee, Rockford, Ill., Port Edwards, Wisconsin, and Oak Brook Air Field, Ill. Paul Butler says he plans to continue expanding its services for general and corporate aviation throughout the U. S.

REMMERT-WERNER, Lambert Field, St. Louis, installed a new interior and new soundproofing in Walter Maki's Firestone Lodestar, as well as a Janitrol heater, Collins 618F transceiver, Bendix Omni Mag, new glare shield with removable radar scope, DC-3 collector rings and short stacks. . . . RCA's DC-3 had a Remmert-Werner 20,000-BTU auxiliary cabin heater installed, along with radome hinging and latching mechanisms and new brake assemblies. . . . Bill Dotter's two International Harvester DC-3's were in, one for new paint and aileron gap strips and engine change and the other for wing removal and inspection, new headliner and new dado. . . . De-icer plumbing and boots were installed on Monsanto Chemical's Twin Beech. . . . Ted Godzwon put two fresh Engine Works R1340's on his Joyce Lumber Mallard.

FREDERICK B. AYER & ASSOCIATES, New York, has a new plan whereby a customer chooses his own interior and modifications, pays for them in monthly installments and gets the $200,000 Convair 240 in which they are installed rent free while settling the decorating and engineering bill. When the sum of the monthly payments equals the cost of the conversion, the corporate customer may then elect to continue the lease at a reduced rate or return the Convair to Ayer without further obligation. Costs for interior, electronics and modifications usually run between $100,000 and $200,000 and a check for this is forwarded by Ayer to the modification center selected, once the cost is determined. When the plane is completed, it is turned over to the customer and the lease officially begins at a rate of $10,000 monthly. In airline 40-passenger configuration, Convair 240's are priced at $200,000 by Ayer. Executive conversions are priced at $335,000.

EXECUTIVE AIRCRAFT SERVICE, Redbird Airport, Dallas, had Kenneth Jolly's Texas Gas Transmission DC-3 from Owensboro, Ky., in for periodic, installation of Sierracote electric windshield, heater overhaul, alternate fuel metering system, modified oil tanks, RCA radar installation with McMillan radome, new VHF communications equipment and engine change. . . . Jerry De Silvestro brought in Clayton Irwin's DC-3 from New York for Janitrol heater, 200-amp. generator system, complete Maximizer kit with wheel well doors and tailwheel fairing, Bendix radar with McMillan radome and complete nav-com system. . . . Also in for work were Russell Johnson's American Liberty Oil DC-3 and Paul Rider's Halliburton Oil Well Cementing DC-3.

ATLANTIC AVIATION, Wilmington, has obtained additional FAA repair station classifications. Airframe now includes Classes I, III and IV without limitations, and Radio now includes Classes I and II covering all nav-com equipment and a limited rating covering radar X band for all RCA and Bendix models. Others include limited instrument for Lear L-2 series, automatic flight controls, and all aircraft fabric work. . . . Atlantic is heavily engaged in Grumman Gulfstream conversions and other work.

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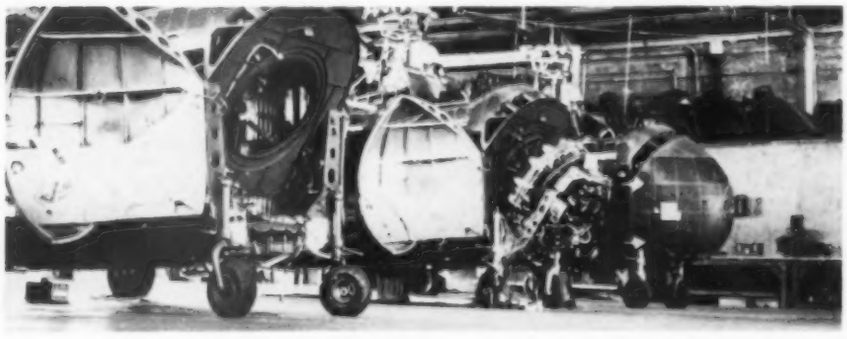

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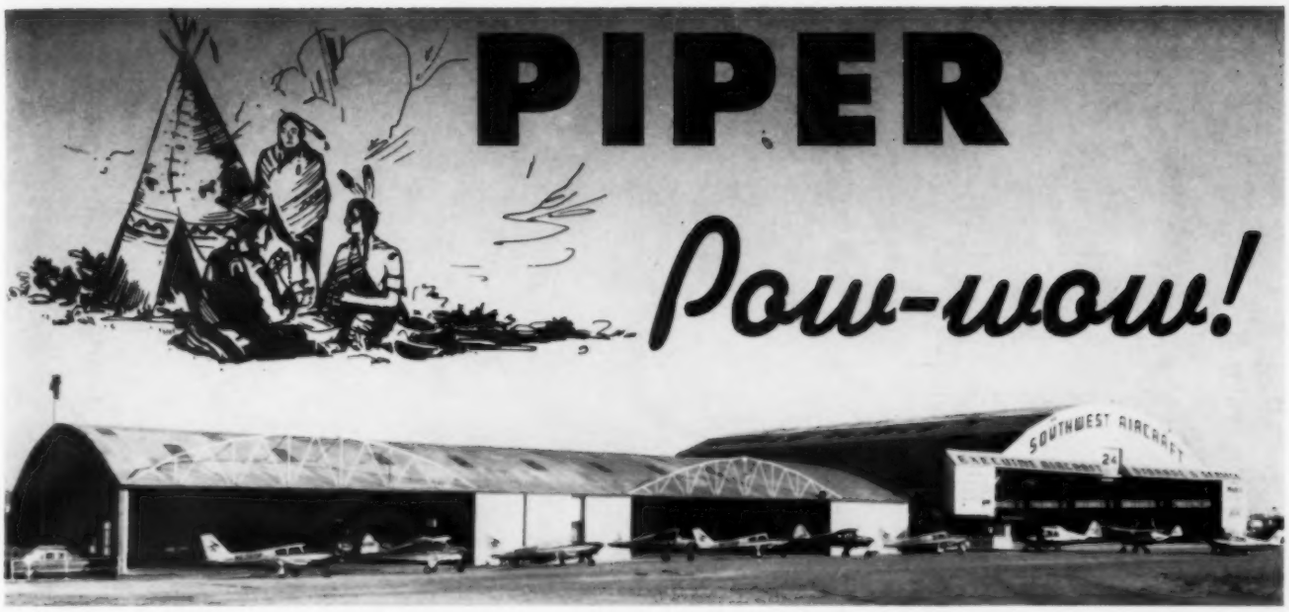

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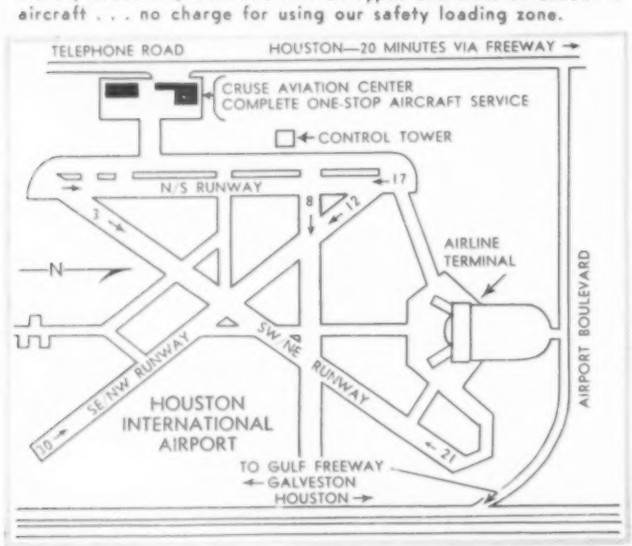

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THE SIGN OF THE FINEST

DALLAS AERO SERVICE, Love Field, Dallas, had in Golden Isle's third de Havilland Dove from Georgia for 8,800-lb. gross modification, new paint and repairs. . . . A Central Airlines DC-3 received No. 4 overhaul. . . . Jim Westbrook's Republic Natural Gas Lodestar received electric re-wiring, interior and annual. . . . Otis Engineering's Lodestar, Art Lloyd, pilot, was in for DAS speed-stability-safety modifications, interior and radio and electric re-wiring. . . . Brown & Root's Widgeon from Houston was in for heater installation, stripping and re-sealing, and bottom skin modification. . . . Special modifications and installations were performed on two special-purpose aircraft — Jim Cook's Weather Bureau tornado-research Lockheed P-38 and Texas Instruments' laboratory-equipped B-25.

AIRESEARCH AVIATION SERVICE, Los Angeles International Airport, has two Convair 440's direct from Convair for General Motors. Each will receive custom interior, aux fuel tanks, exterior painting and other items. . . . Another Fred Ayer Convair 240 was in for interior, engine change, outer wing tanks and paint. . . . Republic Aviation's Convair 240 from Ayer, L. R. Collins, pilot, was in for interior, radio modification, wing tanks and paint. . . . A large Eastern firm's second Fairchild F-27 came in for complete interior. . . . Tracy Service's Libbey-Owens-Ford Convair 340 received Convair speed kit, aux power unit, executive interior, exterior paint and other items. . . . Tom Grove took delivery of his Minneapolis Honeywell Convair 440 after installation of forward lavatory and other work. . . . Wrigley Company's DC-3 is undergoing wing repair, de-icer boot installation and re-license.

PACIFIC AIRMOTIVE, Burbank, has completed E. F. MacDonald's new Martin 404 executive conversion, with inspection, new interior, wet wings, Sperry engine analyzer, aux power unit, radar, autopilot and radio, and larger oil tanks. Jack DeWolfe and Al Block are pilots. . . . Jim Leonard brought in Scaife's Convair 440 for wet wings, paint, aux power unit, aux ADI, extra oil capacity, spark advance, aux compressor, interior, radar and radio. . . . In for miscellaneous work were Charles Eaton's Vinnell Company Twin Beech, Wiley Electric's Fairchild C-82, La Estrella Azul's Twin-Bonanza, Norman Grele's Freuhauf Howard PVD on Douglas's Home Oil Lodestar from Calgary, Joe Snelson's United Transport Howard PV, Don Beeler's Murchison Brothers Twin Beech, Max Pray's Twin Beech piloted by Jean Stroh and Morrison-Knudsen's DC-3.

HOWARD AERO SERVICE, International Airport, San Antonio, delivered a Howard 250 Lodestar to Essex Wire Corp., Ft. Wayne, Indiana, Lane Hartwell, chief pilot. It has Howard power packs, dual nacelle heaters, wrap-around windshield, large side cockpit windows, flap and trailing edge modification, empennage modification and angle of incidence change, rudder spring tabs, prop vibration panels, wingtip pitot heads, electric elevator trim, electric hydraulic pump, dual fuel system, fuel flow meters, complete radio and electric re-wire with Klixon overload protection, complete new radio, radar, electronics and instrument installations and new interior. . . . Donald A. Bond, Celanese chief pilot, was in for production inspection of new Celanese No. 2 Howard 250, featuring long-range tanks, dual fuel system, fuel flow meters, cockpit modernization, wrap-around windshield, large cockpit windows, flap and trailing edge modifications, Howard tail cone, polyurethane spray interior insulation, complete electrical and radio re-wire with Klixon overload protection, new radio, radar and electronics installation and interior. . . . Roy Pendleton's National Steel Super Ventura received sta-foam on nose door, flap speed control valve, decelostats and air brakes. . . . Bruce Freeman's Coastal States Gas Beech C-45 was in for 1,000-hr. overhaul, angle of incidence change, fuel dump system and new interior.

18,734 Hrs. of Engine Reliability

THREE Cessna 170's, used by Transcontinental Gas Pipe Line Corp., Houston, in low-level pipe line patrol and other utility work, have logged a total of 18,734 hours and 15 minutes of flight time without significant engine trouble. Tom H. Wheat, Transcontinental Gas Pipe Line Corporation's corporate secretary and head of aviation, described the maximum engine service experience as "routine and a normal expectation from highest quality engine overhaul, maintenance and operation."

George T. Cendrick, Jr., Transco's superintendent of aircraft maintenance and operations, reported that a fractured glass sediment bowl was responsible for the only flight interruption in the more than two million mile Cessna 170 operation.

Phelps M. Lane, president of Precision Aeromotive Corporation, Houston, the agency entrusted with the 24 scheduled overhauls of Transco's five Continental C-145-2 engines and accessories used in the Cessnas, says that such engine reliability is the rule, rather than the exception, when proper operational, maintenance and overhaul procedures are observed.

In 24 scheduled overhauls of five 145-hp. Continental engines during nearly 20,000 hrs. of Cessna 170 operations, parts replacement was charted by Phelps M. Lane (left). Lenny Wotipka and George Hudson of Precision Aeromotive in Houston. Some of the parts are shown after micrometer and magnaflux checks.

To answer questions about major parts replacements in five engines with a combined total of nearly 20,000 hours, Lane has compiled from shop records a major parts mortality list. From these records a comprehensive unit replacement parts factor has been determined. This information is used in Precision's supply operation to provide the required parts to meet overhaul schedules.

The total time in hours and minutes of the five engines, since new and up

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to the last overhaul, was as follows: 3,301:25; 4,071:30; 4,490:25; 3,-841:00 and 3,339:35.

For interpretation, the major units requiring replacement are grouped into quantity classifications. As an example, 12 units each, or 288 serviceable hydraulic lifters and rocker arms, must be provided to complete 24 engine overhauls.

Replacements were as follows:

	Units Rejected	Unit Percentage Rejection Factor
Hydraulic Units	82	.2847
Rocker Arms, Intake and Exhaust	3	.0104

In regard to pistons, cylinders, exhaust valves, intake valves and piston pins, 6 of each units, for a total of 144 were required.

	Units Rejected	Unit Percentage Rejection Factor
Pistons	30	.2083
Cylinders	25	.1736
Exhaust Valves	19	.1319
Intake Valves	14	.0972
Piston Pins	29	.2013

On single-unit usage for the 24 overhauls, the following experience was realized:

	Parts Units Replaced	Percentage Factor Unit
Camshafts	12	.50
Crankshafts	1	.0416
Sump Assembly	1	.0416
Crankcases	5	.2083
Oil Pump Gear	3	.1250

Lane says that records of Transco's engine overhauls, and many others, have shown that long-term economy results from the use of factory-new parts, and that early replacement of one part often eliminates the necessity of replacing several compatible parts at succeeding overhaul periods.

While some operators may regard scheduled all-out engine overhauls to highest standards as high in cost, Lane believes that more costly delays, interruptions in engine service, and lower safety standards which can result from sub-standard overhauls would outweigh, in cost, the questionable economy resulting from less than standard work.

Lane listed the following factors as of importance in Transco's highly successful engine service experience: (1) scheduled all-out overhauls with reasonable limits of time between overhauls; (2) the use of factory-new parts and techniques at each overhaul period; (3) incorporating all recom-

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mended as well as mandatory service bulletins at each overhaul period; (4) complete engine testing after overhaul, with appropriate tests to double-check the efficiency of the overhaul; (5) proper re-installation of the engines in the aircraft, and (6) operation and maintenance by Transco in accordance with factory recommendations.

DARE NAV-COM SYSTEM

(Continued from page 74)

short ⅜ ATR rack; converter ½ height, short ¼ ATR.

DARE DTR-360B VHF TRANSCEIVER — Featuring powerful 20-watt transmitter, this transceiver provides crystal control, 360 channels covering 118.0-135.95 mc with 50-kc spacing, SCS and DCS operation and precision dynamotor power supply. Single-unit 360B weighs 23.56 lbs., fits ½ ATR rack. Complete 360B, including control heads and shockmount, weighs 27.4 lbs. and is priced at $3,149.52.

DARE 90 CR TRANSCEIVER — This is a standby communications unit, self-contained with transistorized power supply, with 90-channel transmitter and tunable whistle-stop receiver. Complete with control head and shockmount, this small unit weighs 10.5 lbs. and is priced at $1,020.

DARE DADF-1 SYSTEM — This compact 3-band receiver has self-contained transistorized power supply with extremely low current drain and new standard ARINC-type tubes. It features super performance on weak stations. The control has large, easy-to-read tuning numbers. It fits standard short ⅜ ATR rack, weighs 20.1 lbs. complete including shockmount, loop and fairing, remote head and rotatable azimuth indicator, and is priced at $2,325.

DARE DGS-20 GLIDESLOPE and DARE DM-3 MARKER BEACON RECEIVERS — These small units fit short ¼ ATR rack and have self-contained transistorized power supplies, providing 20-channel glideslope operation and 3-light marker. DGS-20 weighs 5.9 lbs. and DM-3 7.8 lbs. for total of 13.7 lbs. and two-unit package is priced at $1,648.

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